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Gas Journal

VOL. 286. 108th YEAR. LONDON, APRIL 18, 1956. No. 4840. PRICE 1/6

Cooking is a combined operation—

not a relay race

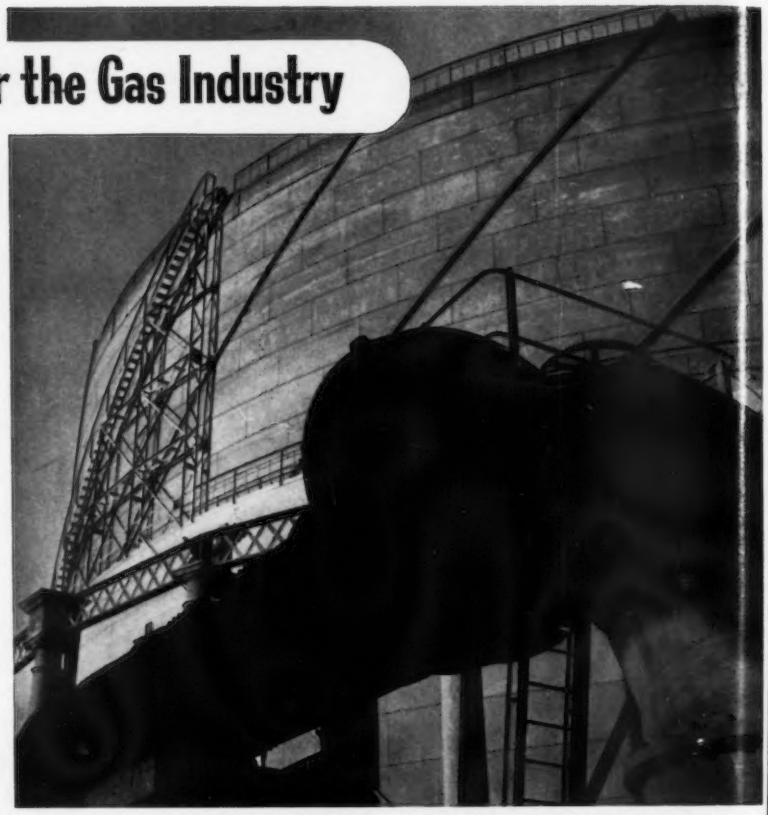
The De La Rue 'Warwick' gas cooker cooks everything at once. It's a picture of smooth organization. You should recommend it for the family that likes to have a friend or two in to dinner now and then. Whatever the emergency the 'Warwick' will cope comfortably. Its five burners, the level grill, and large capacity oven save time, save effort. Thanks to the 'Warwick' both food and cook reach the table in perfect condition.

DE LA RUE GAS COOKERS

THOMAS DE LA RUE & CO. LTD., (POTTERTON DIVISION), 20/30 Buckhold Road, Wandsworth, London, S.W.18.

Photograph by courtesy of the Gas Council

Aluminium Paints for the Gas Industry



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Represents the latest and greatest advances in the protection of iron and steel subject to very high temperatures. "LUMEROS X" gives adequate protection at temperatures up to 600°C. Good water resistance. No undercoat required. Available in Aluminium or Black.

"METTAL" Aluminium Paint.
A general purpose paint of the highest quality and durability and possessing great brilliance. For indoor and outdoor use. Whilst not specifically designed as a heat resisting coating "METTAL" will stand temperatures around 212°F (100°C).

"METTAL" (Thermal).
Specifically designed for indoor and outdoor use on metal surfaces up to 350° F (177°C).

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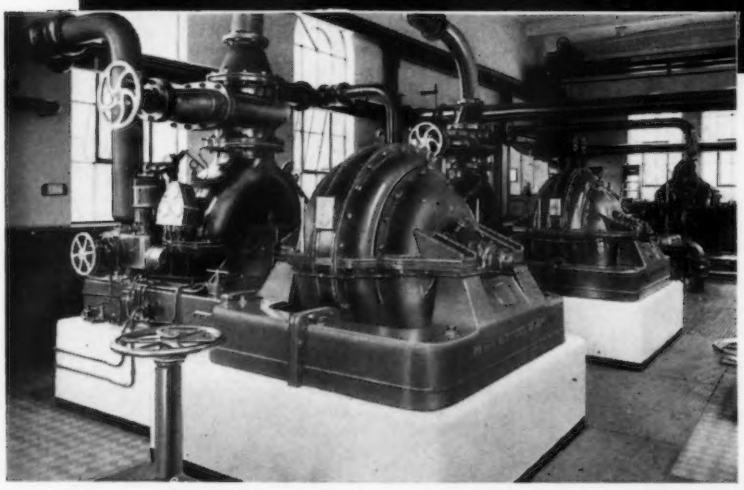

Photograph by courtesy of South Eastern Gas Board

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- HIGHER EFFICIENCIES
- IMPROVED MECHANICAL DESIGN

'CM' 62 Two Stage Turbo Boosters each to pass 500,000 cubic feet per hour at 5 lbs per square inch (Gas—specific gravity = .5) Driven by 260 b.h.p. Brotherhood Turbines running at 7,000 r.p.m.

Installed at Waddon Works, Croydon, for the supply of gas to:— Redhill, Horley, and Crawley New Town.

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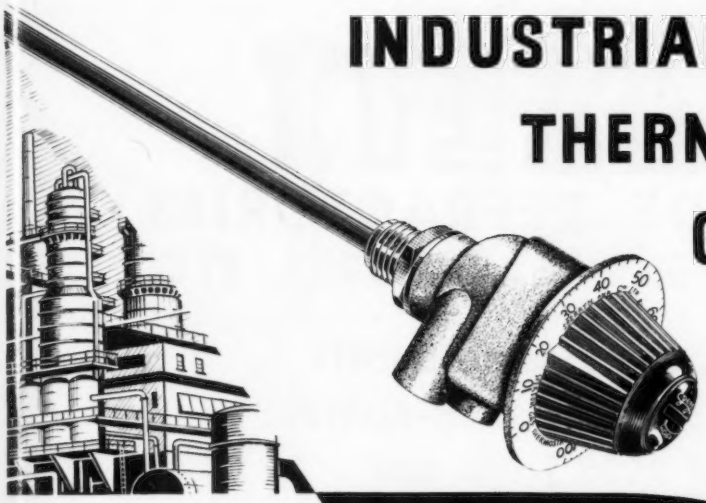

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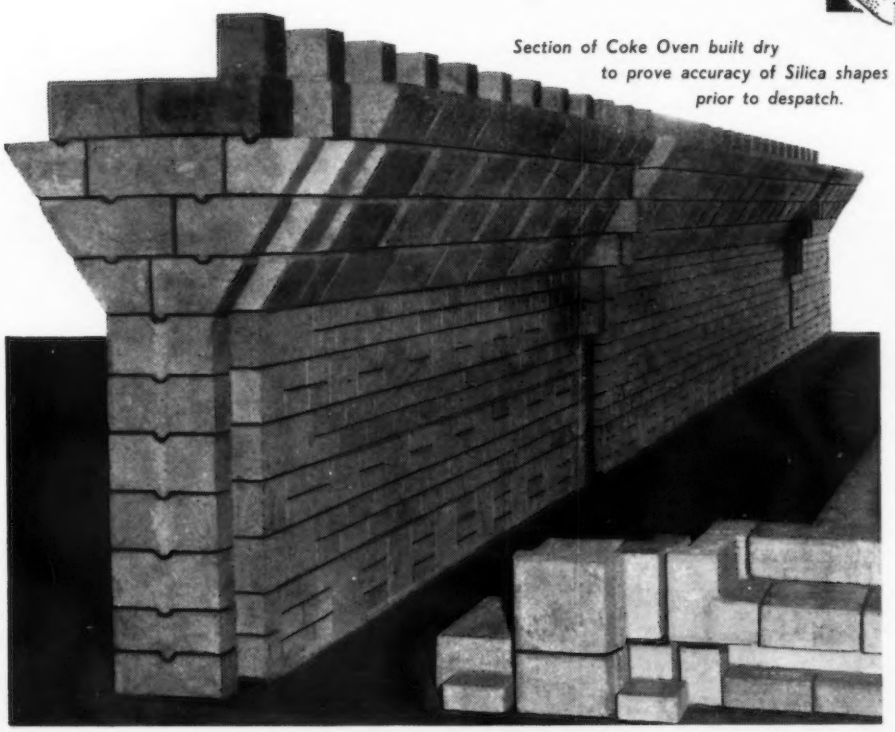

Section of Coke Oven built dry to prove accuracy of Silica shapes prior to despatch.

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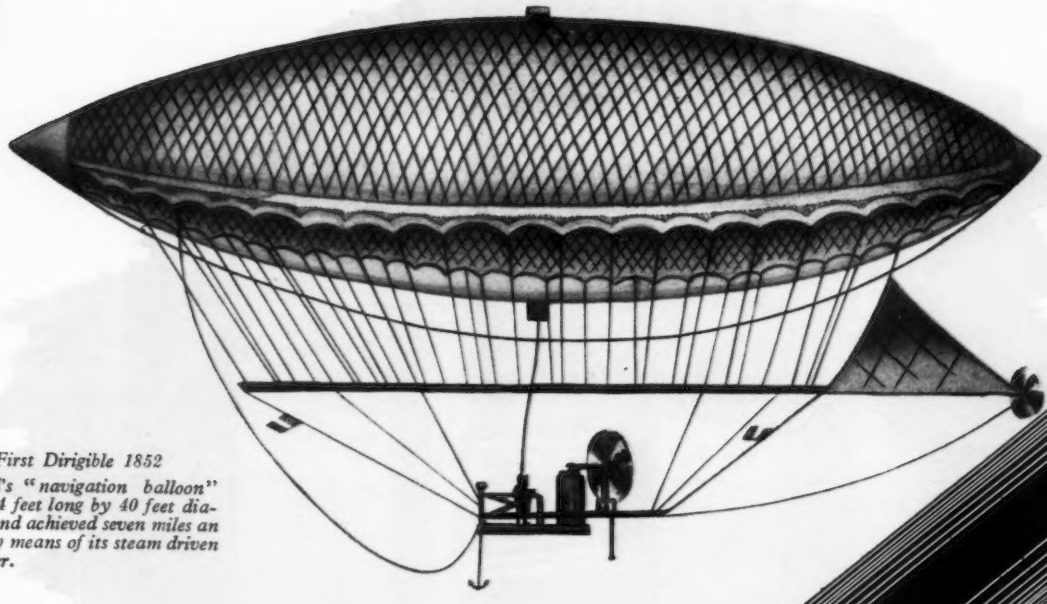

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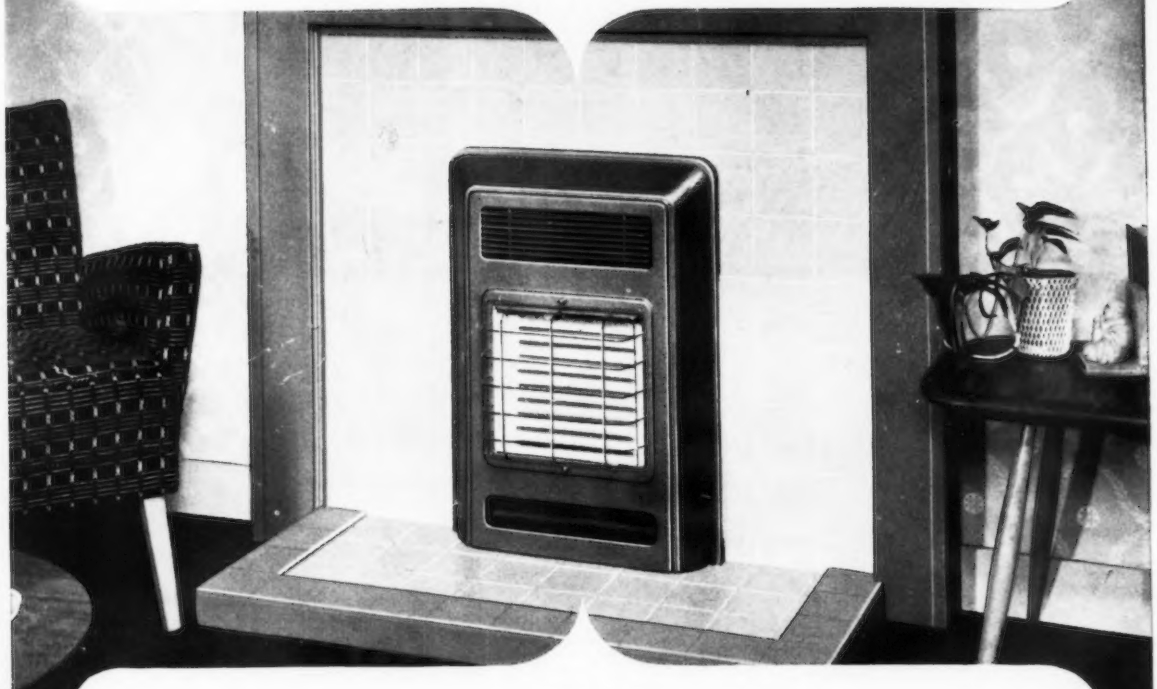

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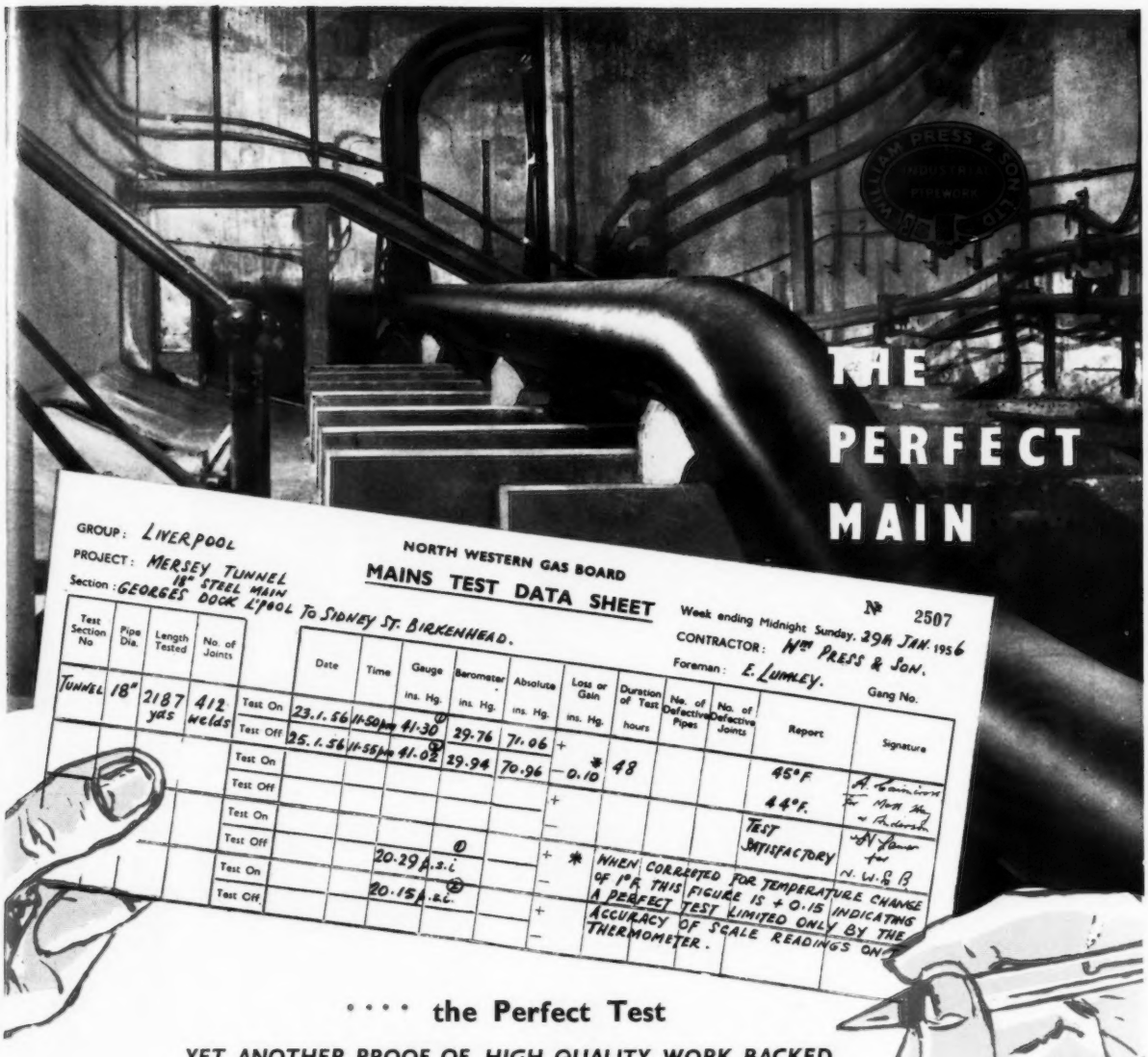

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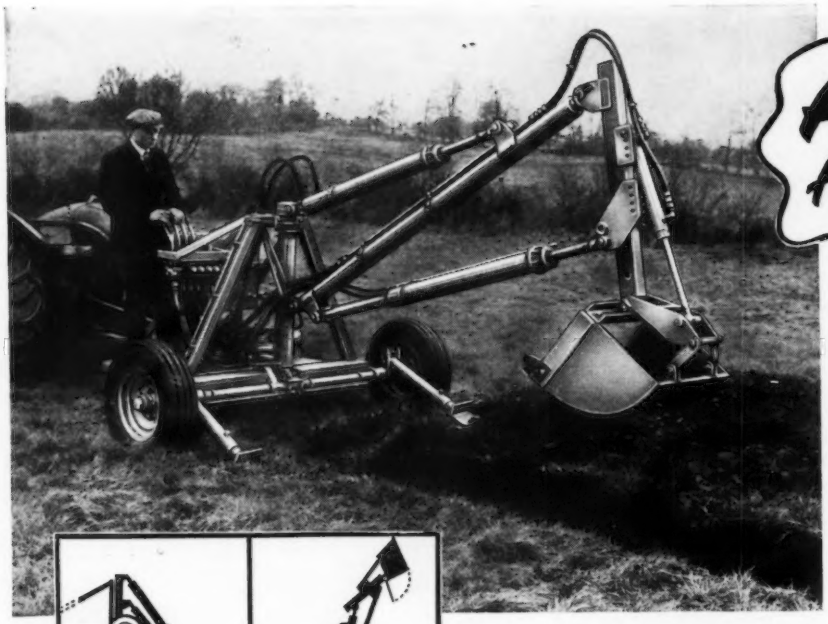

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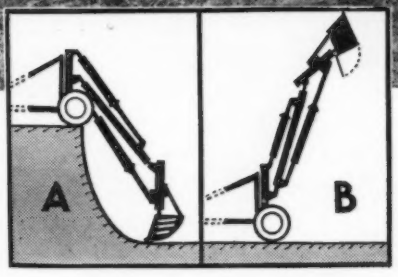

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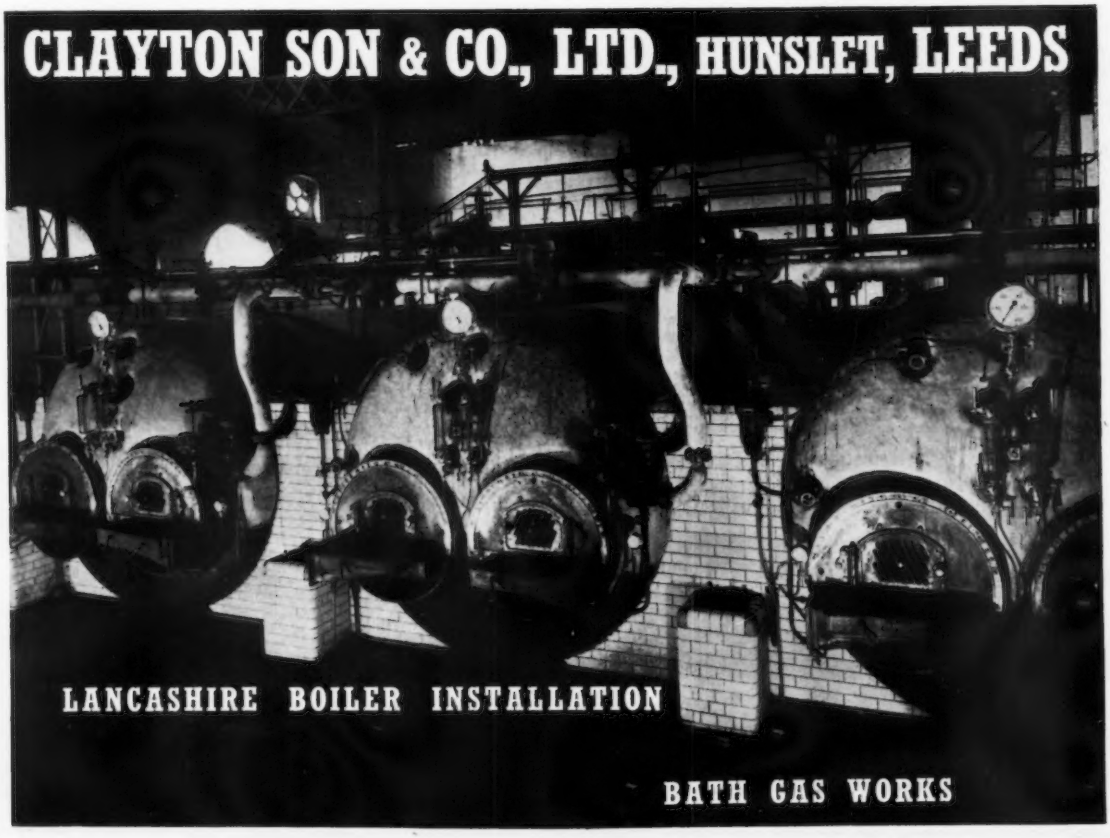

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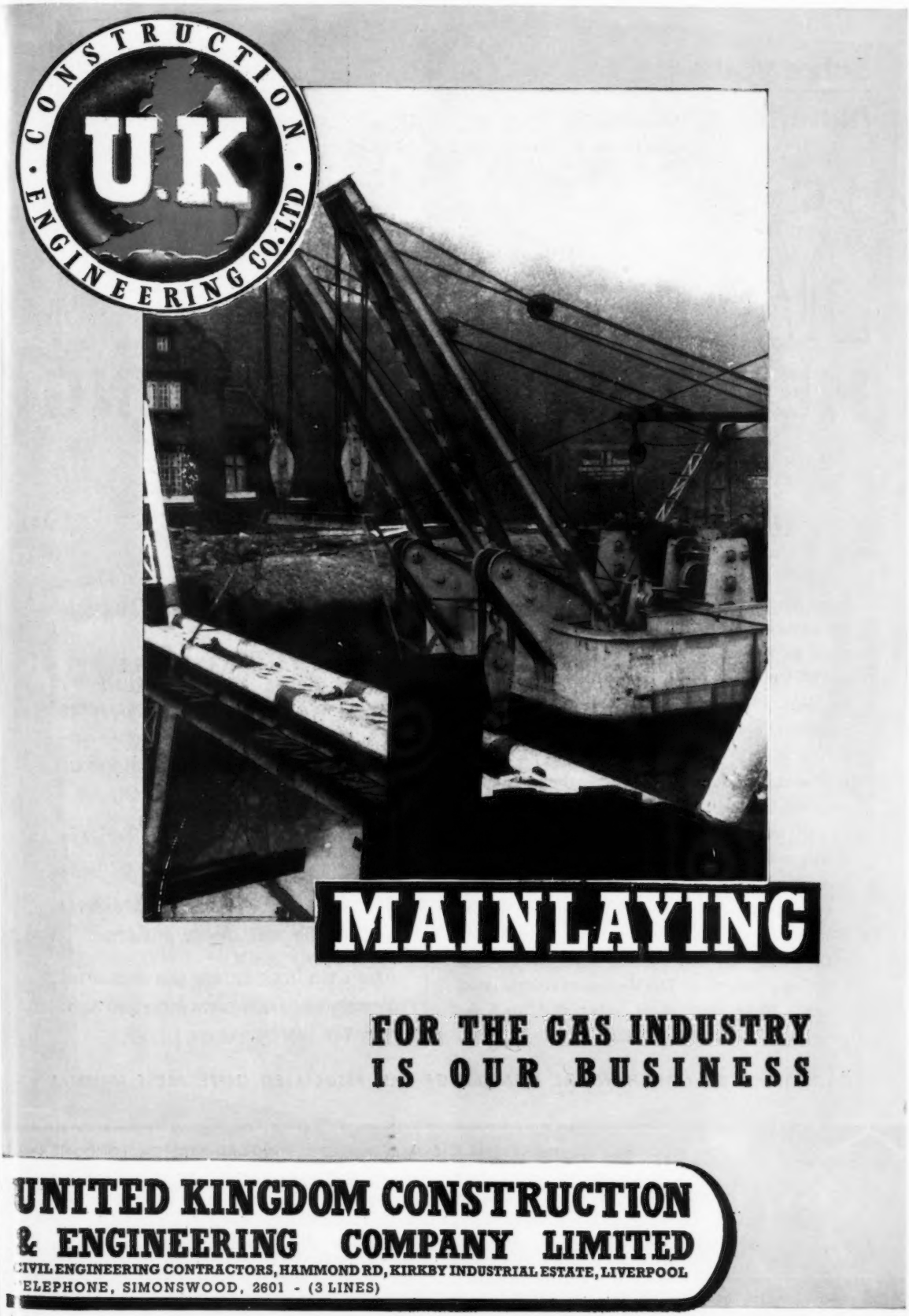
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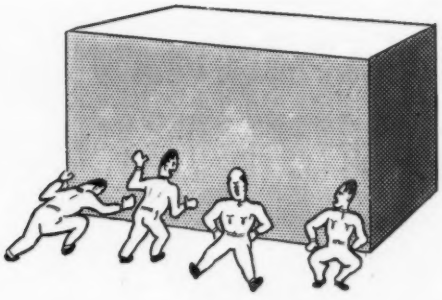

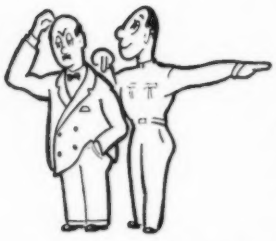

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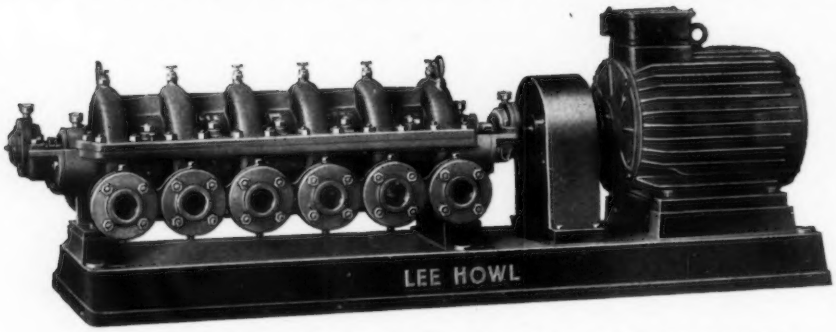

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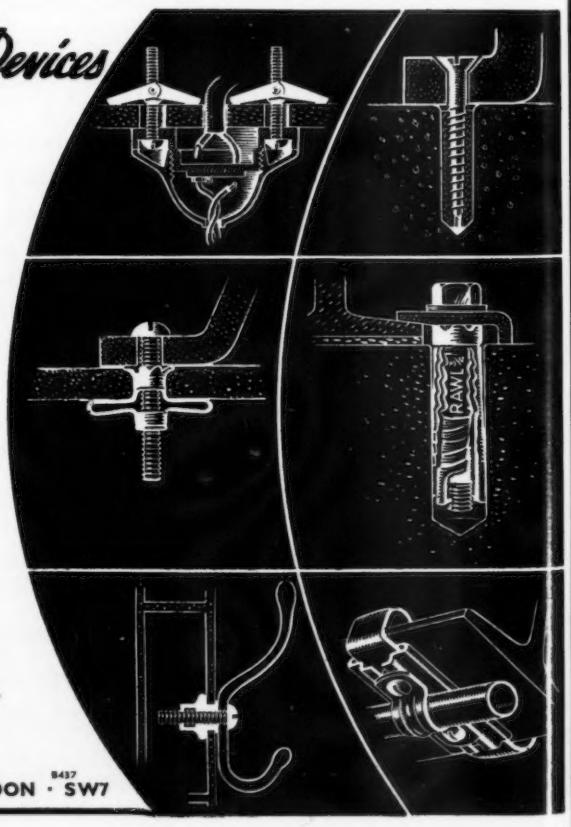

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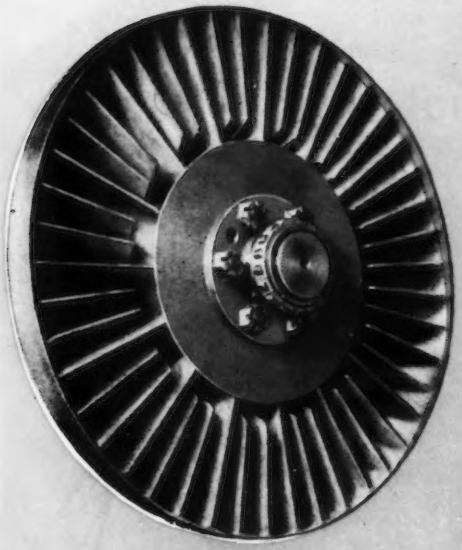

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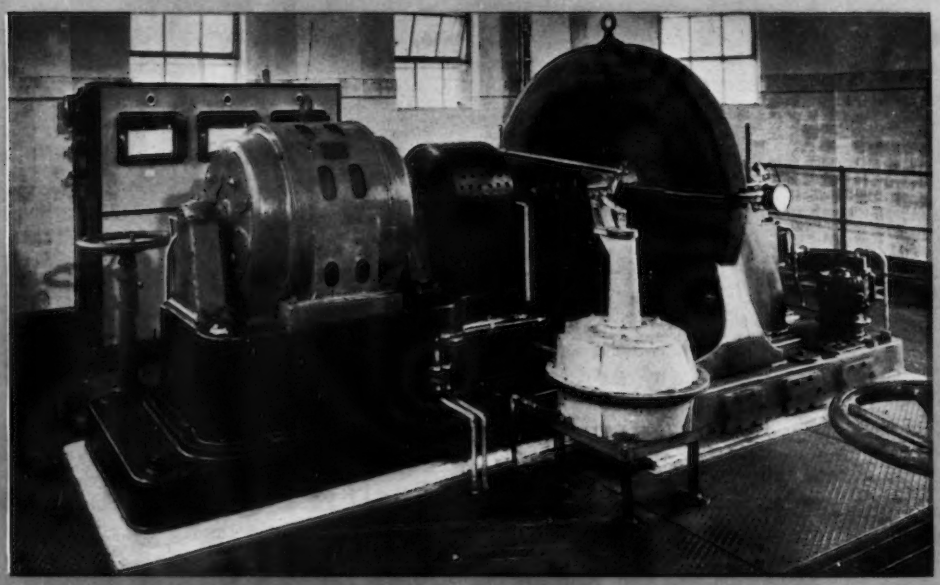

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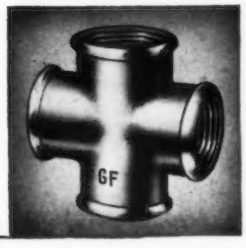

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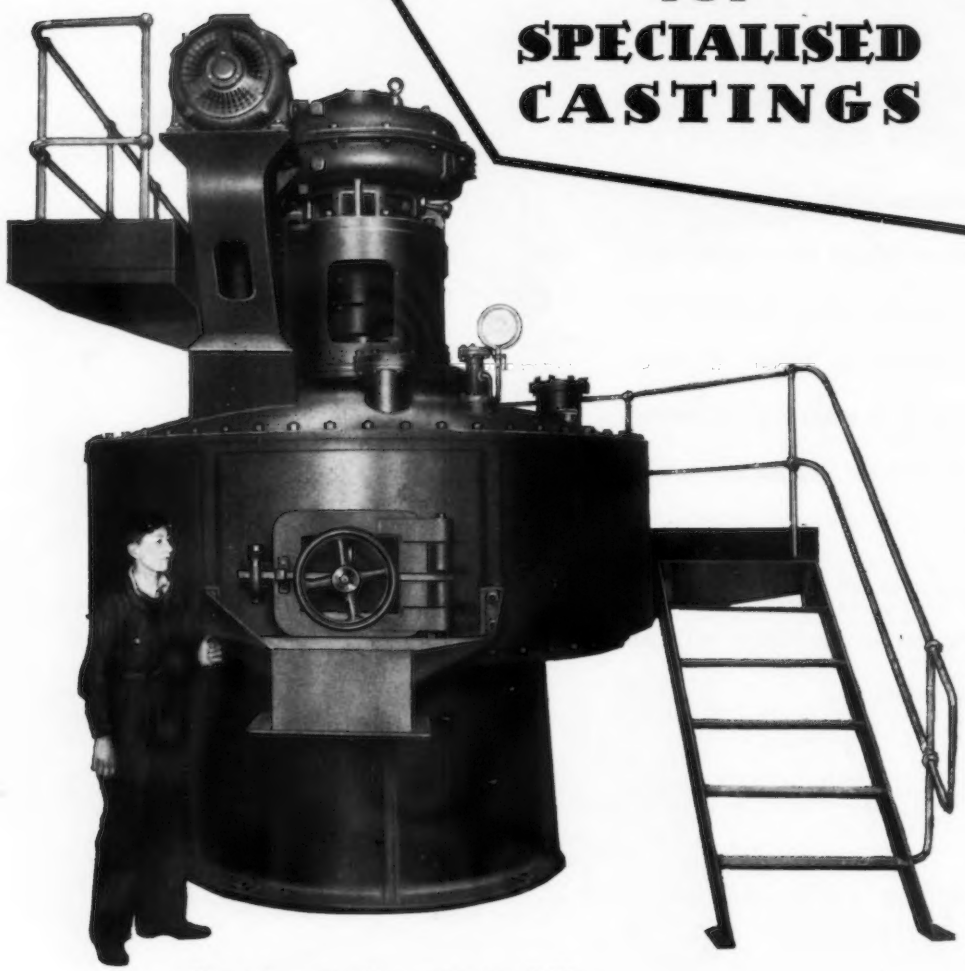

Illustrated:—a motor driven vacuum drier, 7′ 9¼″ dia. × 2′ 6″ deep; steam heated by coils cast in the body and base.

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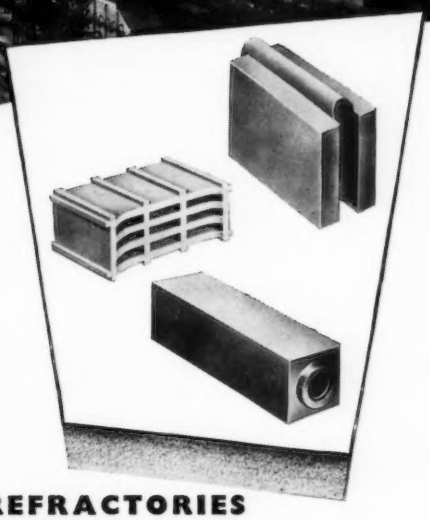

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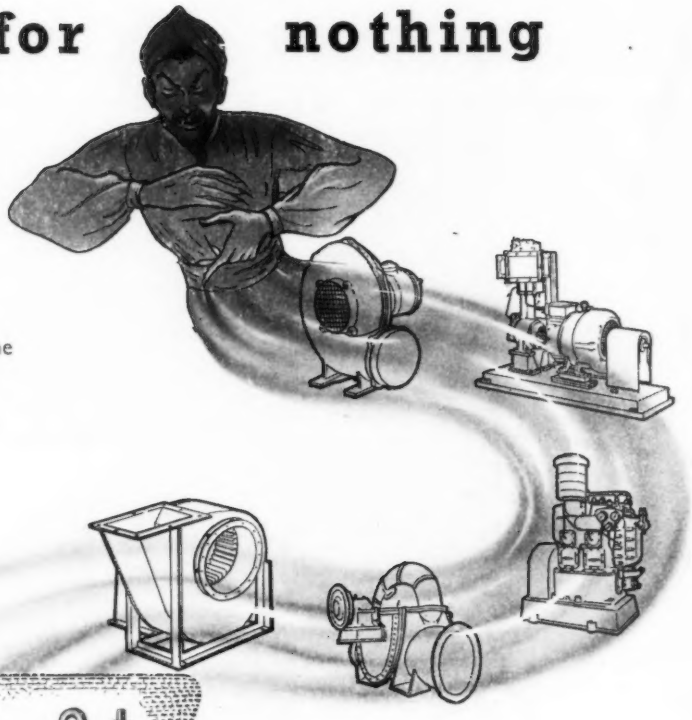
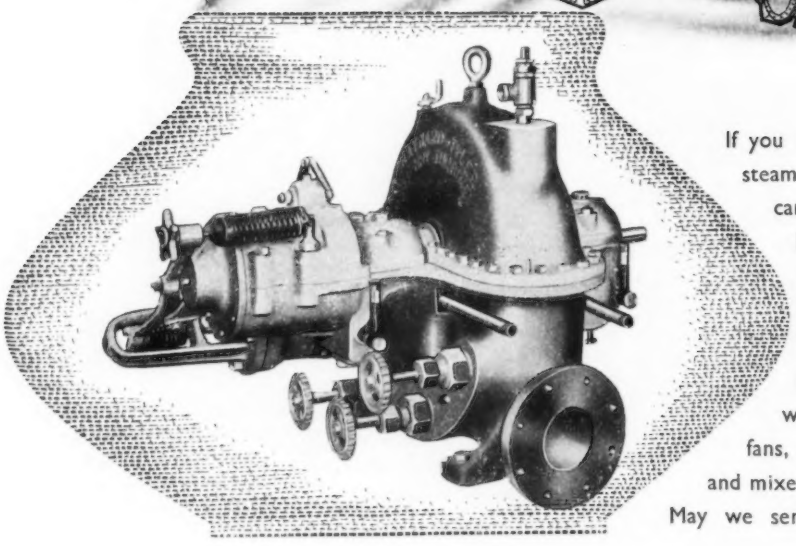


The Genie of the Jar, who works for nothing, is no magical apparition from the East. He is our old acquaintance Waste Steam. But he only works for those who know how to use him!



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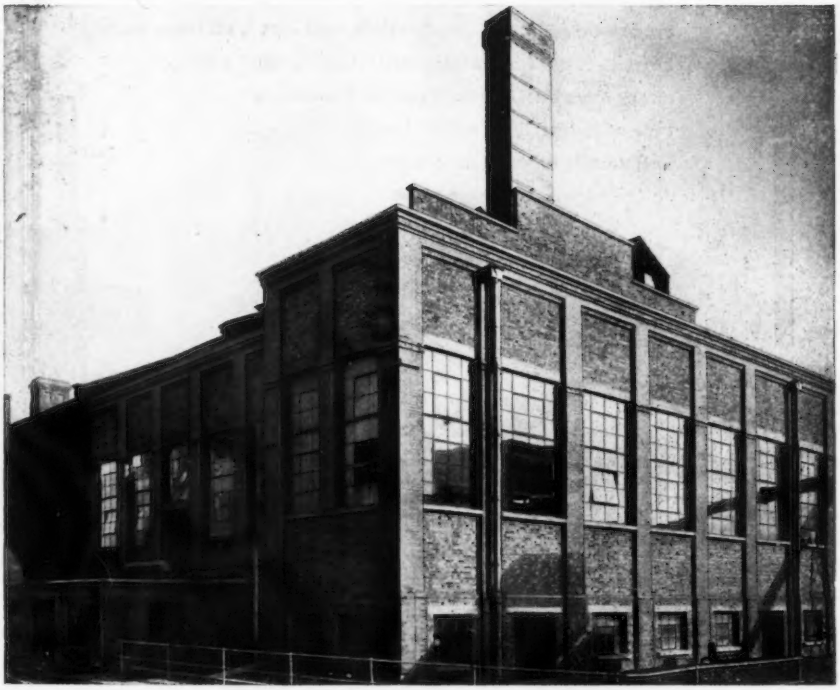

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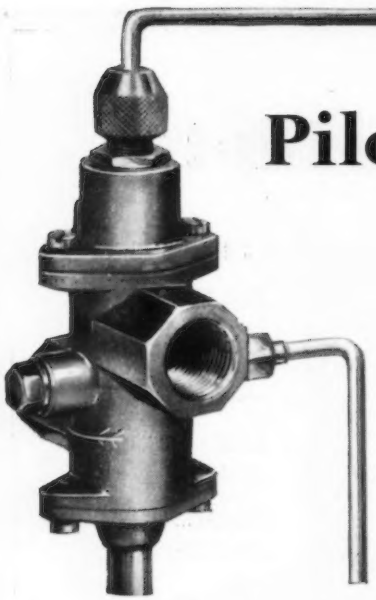

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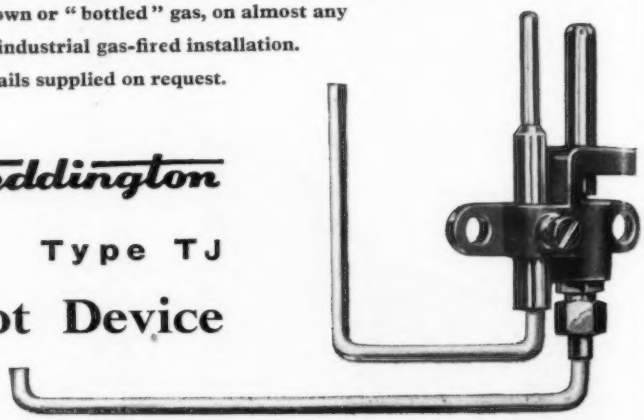
The Teddington TJ Pilot Device withholds gas from main burner till pilot is properly alight, and cuts it off from both burners if pilot is extinguished. Can be used with either town or "bottled" gas, on almost any type of industrial gas-fired installation. Full details supplied on request.



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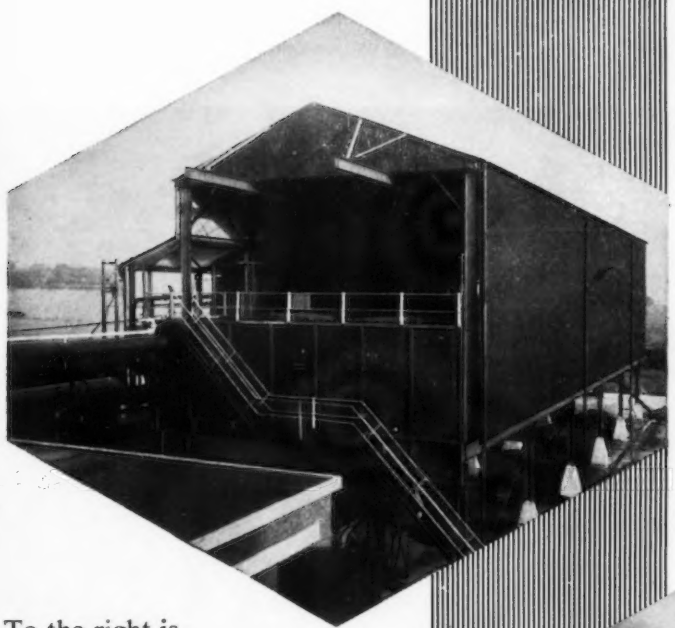
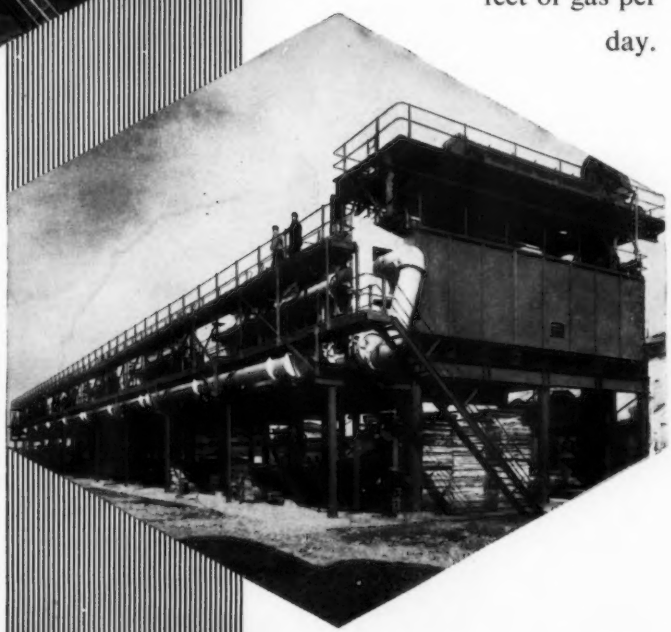


The recently completed installation to the left consists of five welded steel purifier boxes, each 24 ft. by 30 ft. by 10 ft. deep, which were designed, fabricated and erected by Whessoe for the National Coal Board at Stella Gill (Chester-le-Street).

The capacity of this installation is 4 million cubic feet of gas per day.



To the right is illustrated a 6 million cubic feet per day installation designed, fabricated and erected by Whessoe for the North Western Gas Board works at Warrington. It consists of five welded steel boxes, each 45 ft. 9 in. by 35 ft. by 10 ft. deep.

These two installations are examples of the wide range of gas plant made by Whessoe for the gas and coke oven industries.

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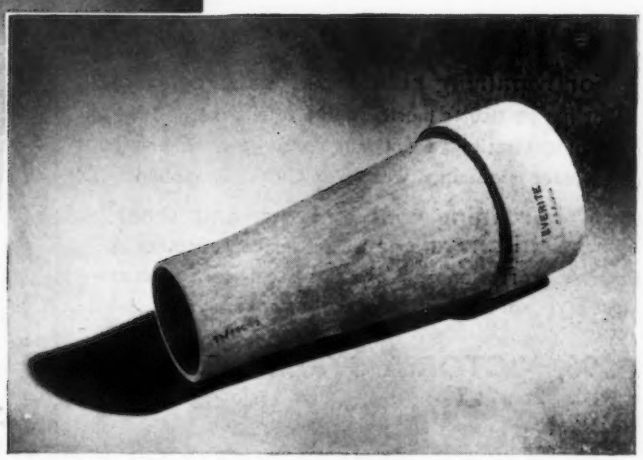

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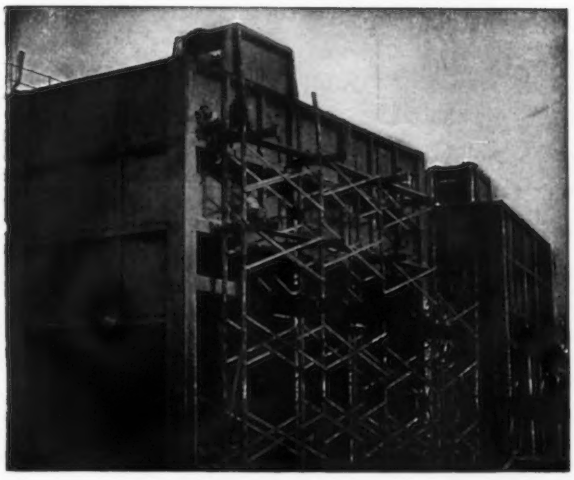

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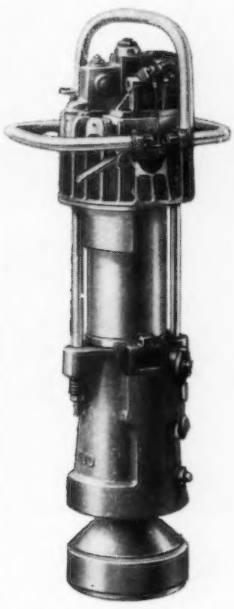

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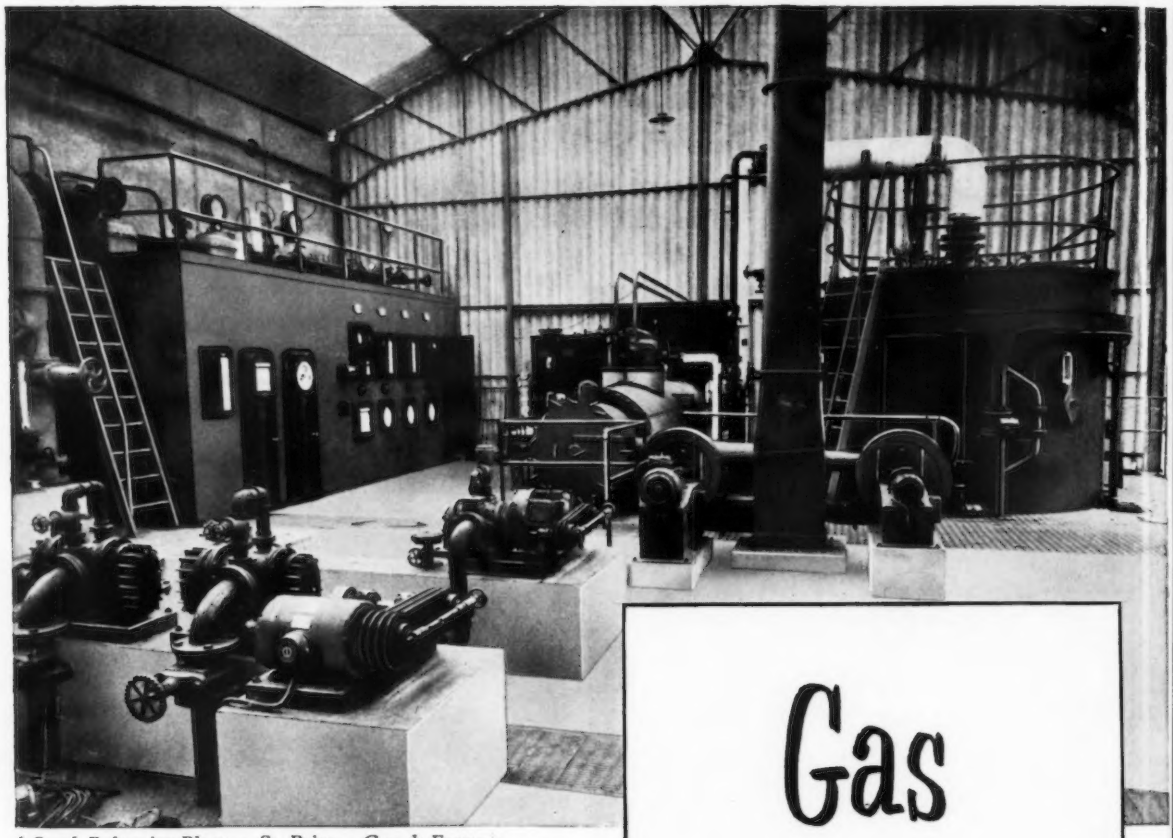

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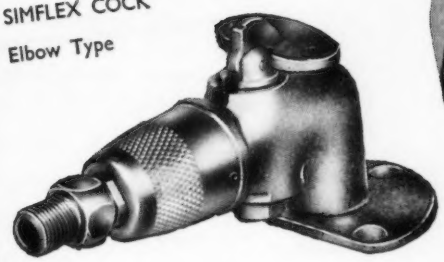

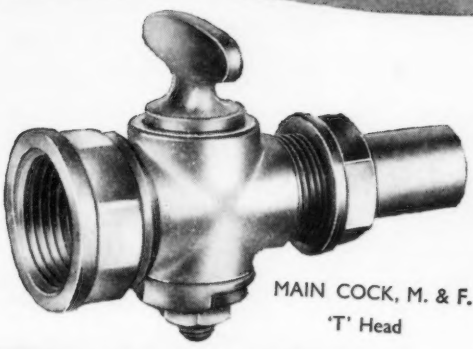

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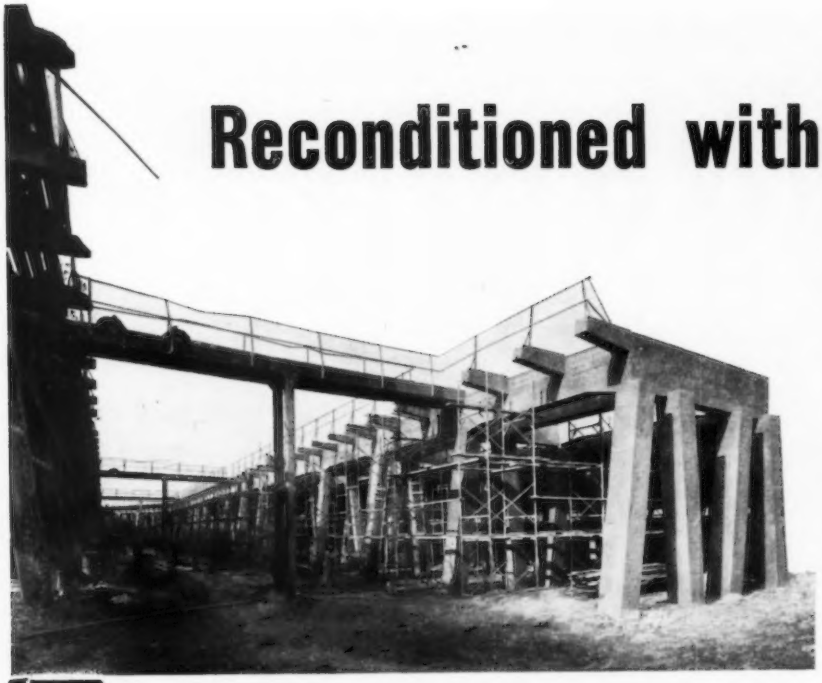

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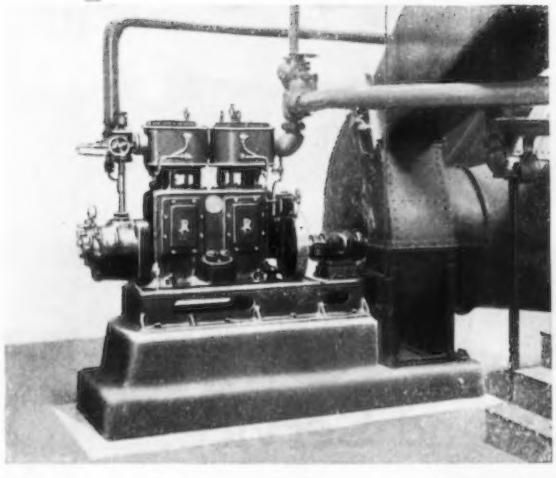

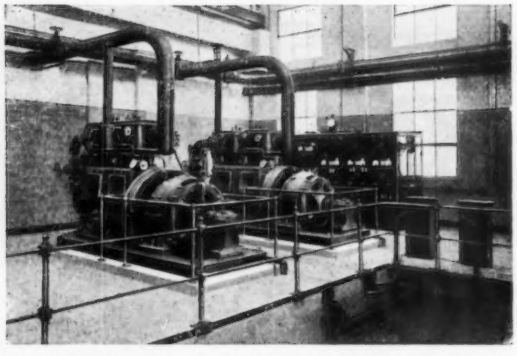

ABOVE : *Parker Engine driving fan on waste heat boiler at a gas works, exhaust steam used for heating feed water.*

RIGHT : *Parker Engines driving electric generators at a gas works.*

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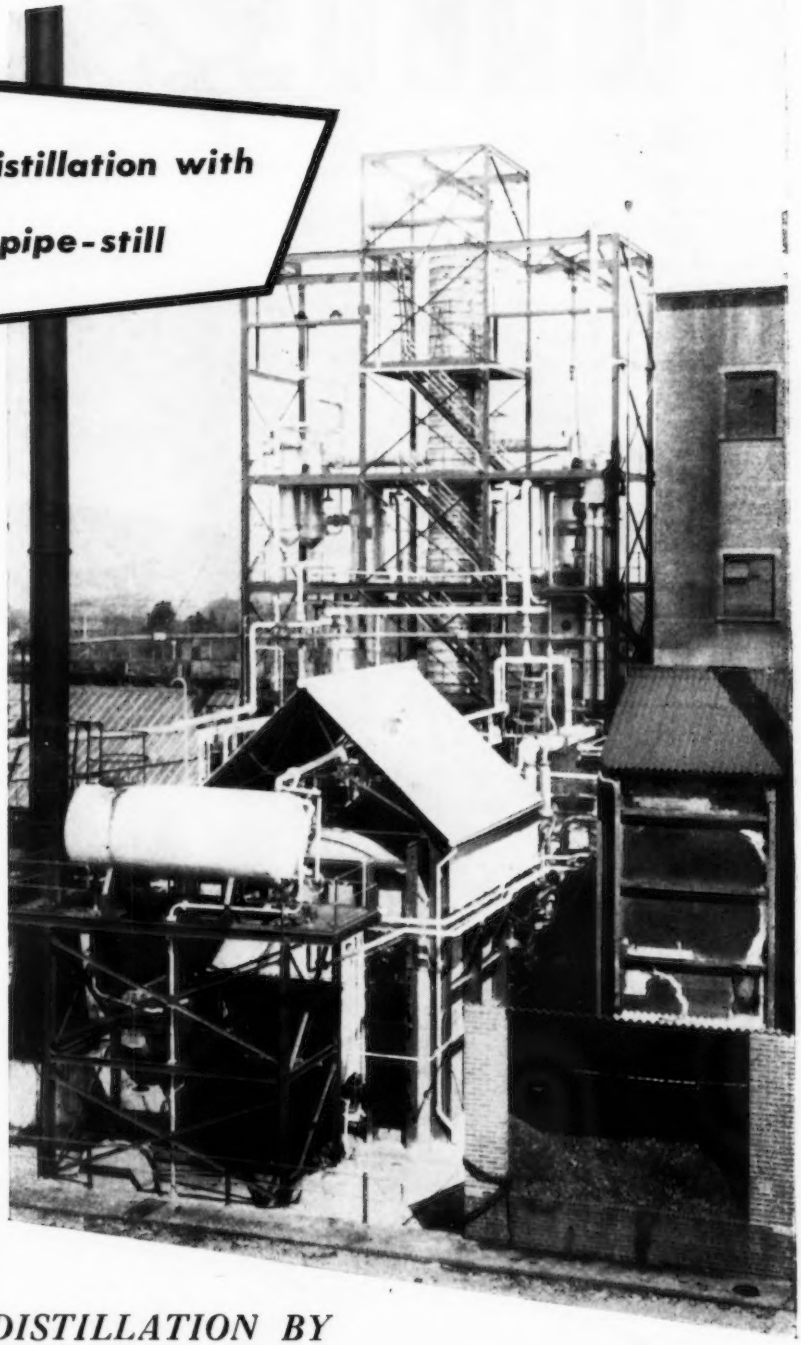

This 150 tons per day distillation plant has been designed and constructed by Chemical Engineering Wiltons Ltd. at Cærphilly for the South Western Division of the National Coal Board.

The plant uses the well established Wilton system in a pipe-still specially designed to meet the demand of modern works for efficient operation and maintenance.

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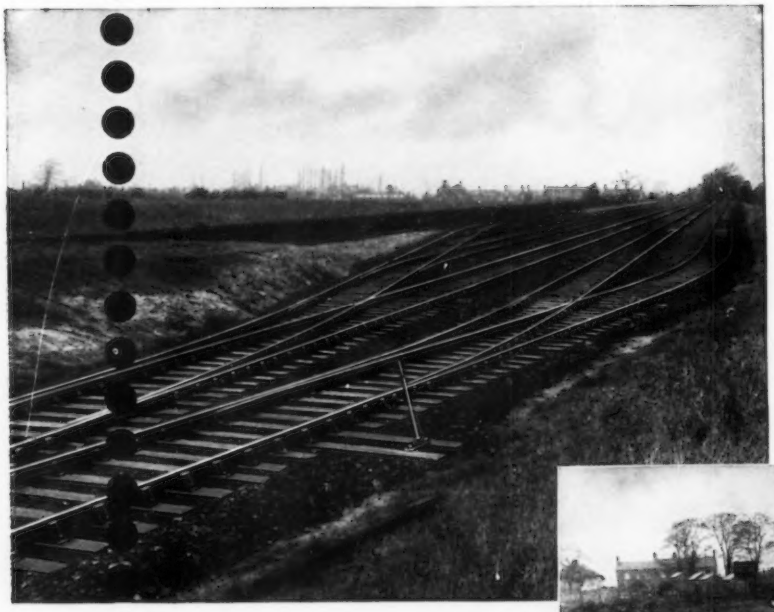

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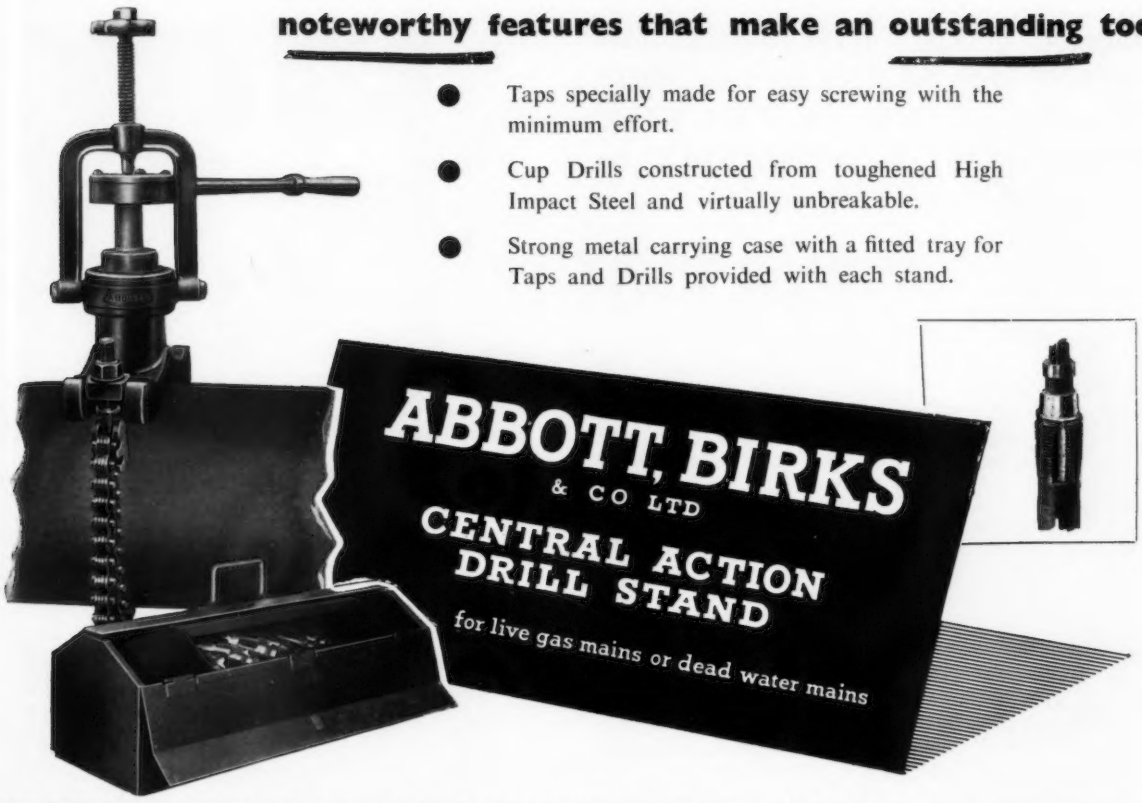

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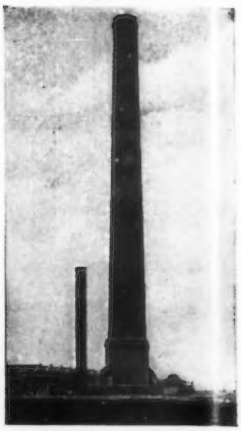
Left : Trial borings for reconstruction of Coventry Cathedral.



Two of the largest chimneys in the British Isles; on foundations of Francois Concrete Piles (left) and Francois Cementation Piles (Right)

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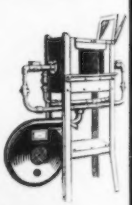

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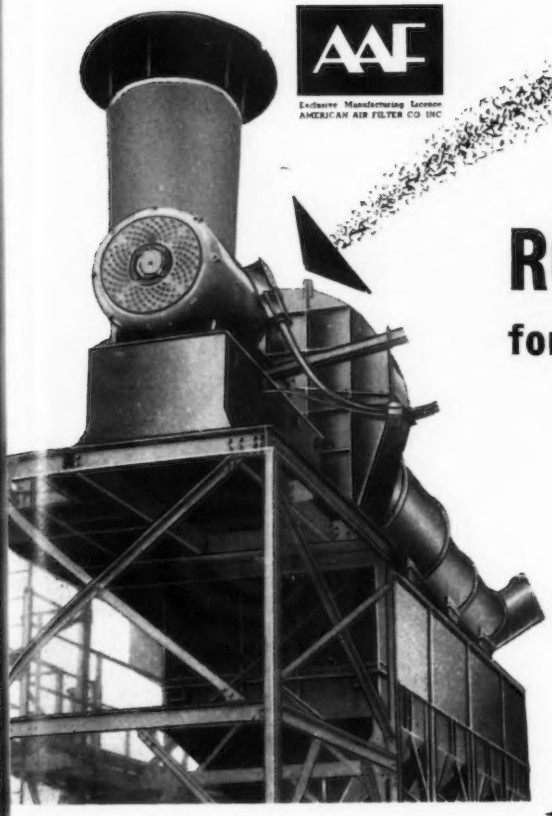

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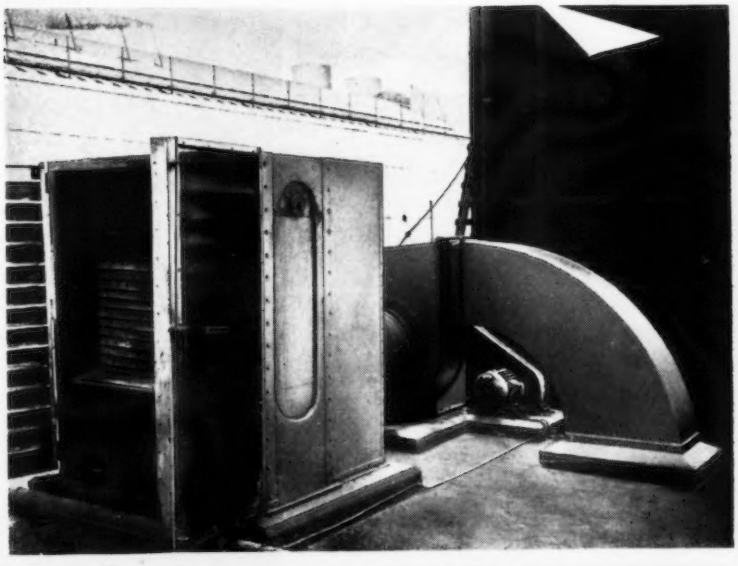

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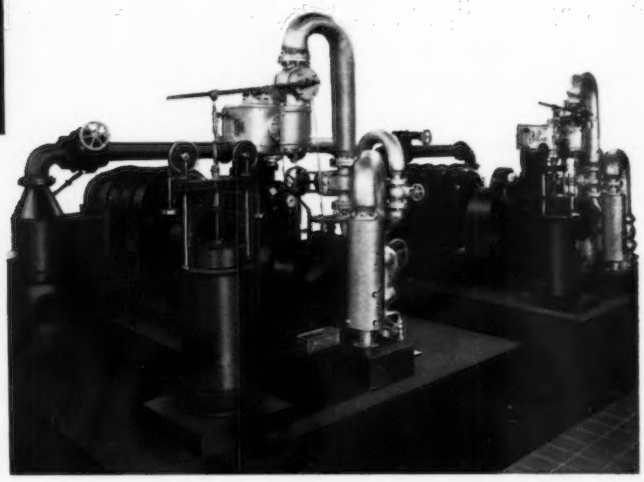

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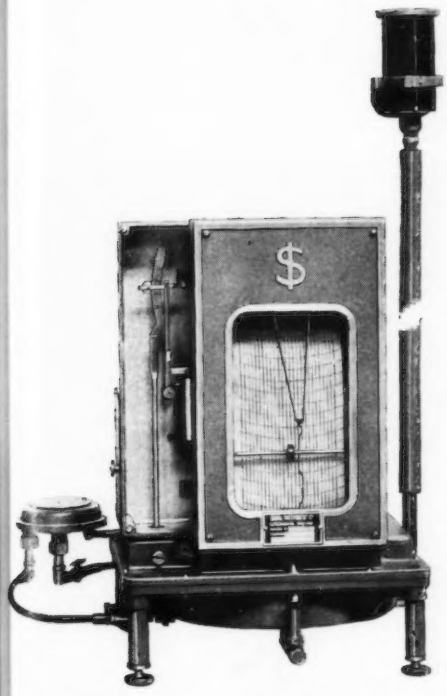

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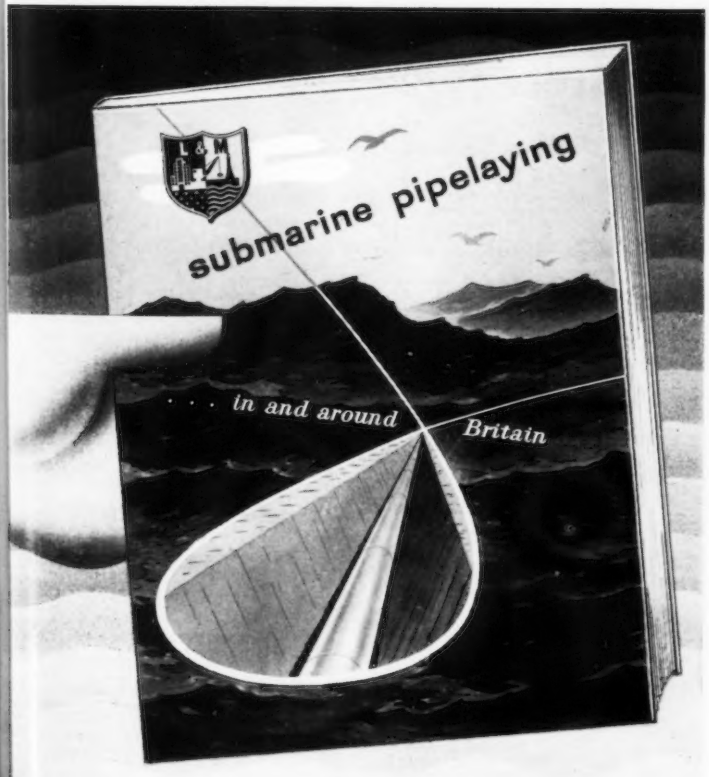

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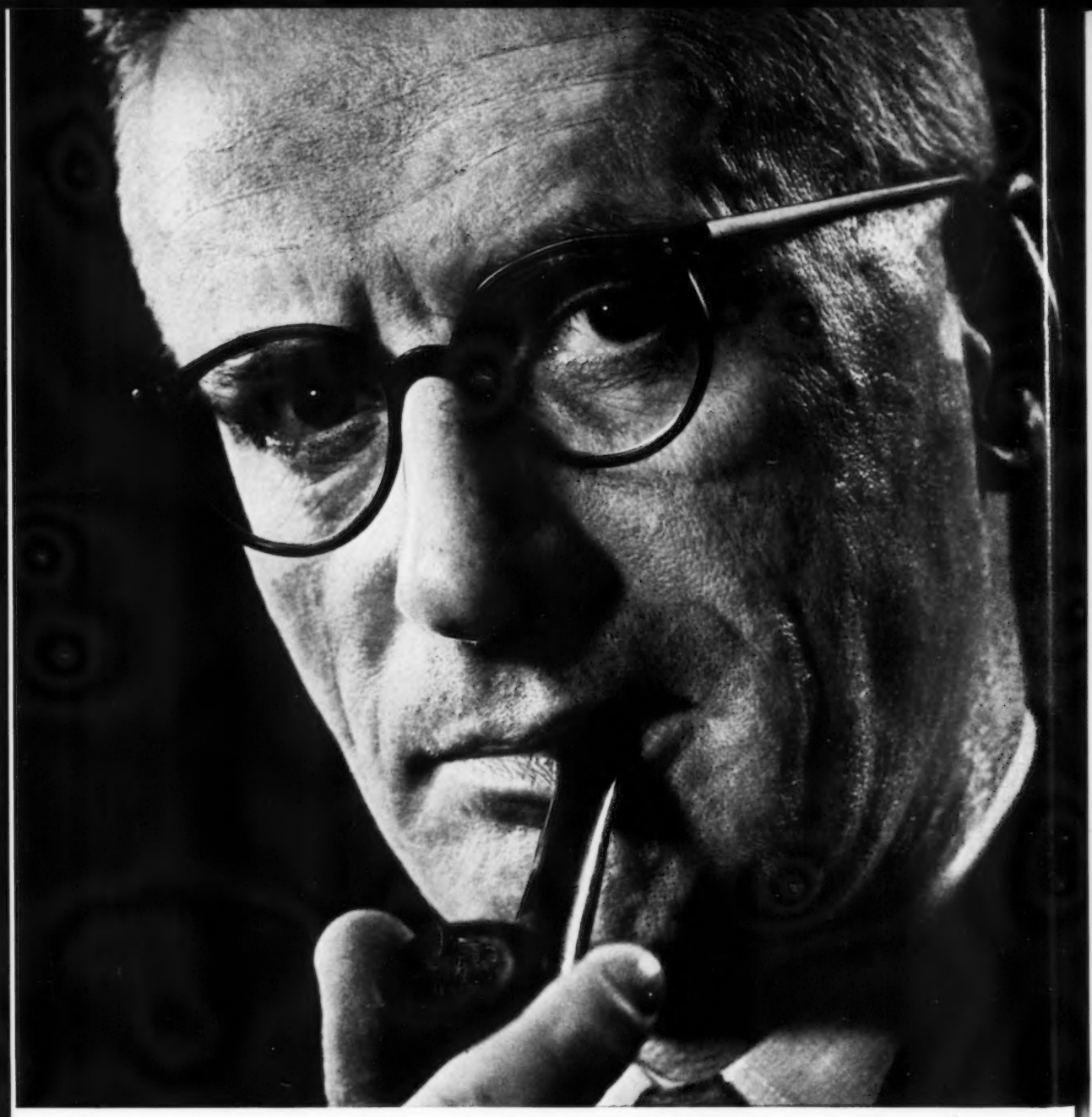

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Gas Journal

VOL. 286 NO. 4840 April 18, 1956

108TH YEAR

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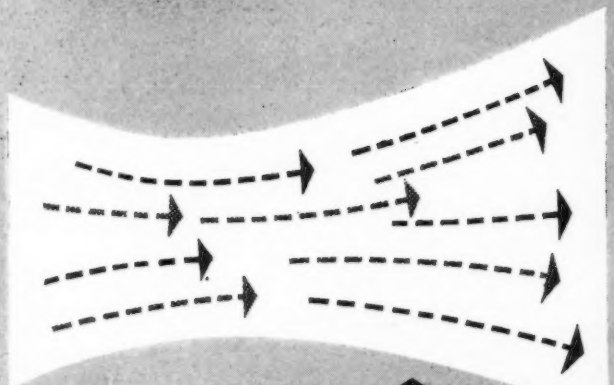

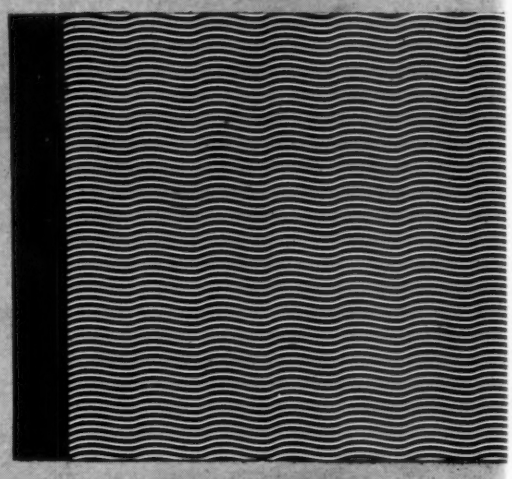

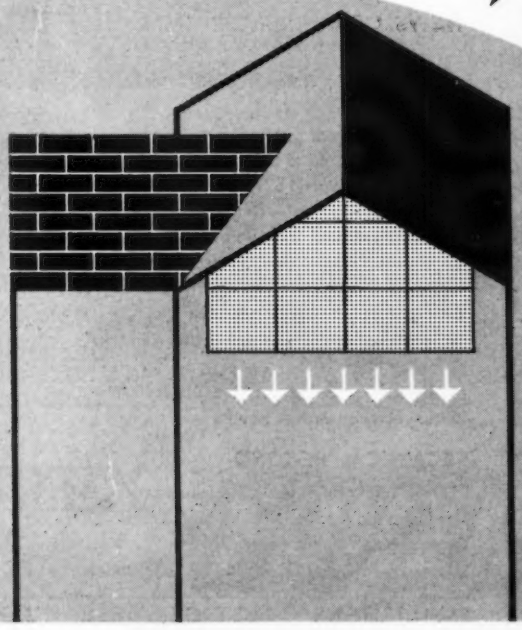

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Gas Journal

VOLUME 286. No. 4840. APRIL 18, 1956. 108th YEAR

Towards Clean Air

AS a first step towards the removal of lethal impurities from the atmosphere of our cities we welcome the third reading of the Clean Air Bill in the Commons last week. But, of course, it is only a first step or interim measure. Dr. Edith Summerskill summed it up rather neatly during the debate when she said that it would be regarded as an important addition to public health law, but that in a few years another Bill would be passed as the present one contained defences which could be used by the anti-social.

This is true. In particular we deplore the retention of the defence that a contravention of the prohibition of the emission of dark smoke might be due solely to the use of unsuitable fuel. Moving an amendment to delete this defence, Dr. Barnett Stross said that it had been argued that its retention would enable a coach and horses to be driven through the provisions of the Bill. We agree entirely. As was pointed out in the House, this clause undermines the effect of the Bill in respect of hand-fired furnaces, and to the industrialist without social conscience to whom it grants a liberty which can—and, human nature being what it is, probably will—become a licence. For with this defence in the Bill how is a successful prosecution to be brought against the recalcitrant industrialist who, unfortunately, is still largely responsible for black and dark smoke?

Defending the clause, Mr. Duncan Sandys, Minister of Housing and Local Government, claimed that no expert authority was prepared to say that, in all circumstances, it was possible to avoid the emission of dark smoke when unsuitable fuel was used, and that it would not be reasonable to ask a factory owner to shut down his furnaces because it was impossible to avoid the emission of dark smoke if suitable fuel was not available. And if that does not open up a *via regia* for the coach and horses, it is difficult to know what does.

However, it is clear that the Bill is officially regarded as a temporary measure only, for the Minister added that if he thought that this was going to be last occasion on which clean air legislation was likely to be passed there might be a strong case for putting a time limit to the use of the defence of suitable fuel not being available, but that after a period of years the defence should be eliminated. He mentioned a period of ten years—a long, long time in which to remedy a cardinal error. We hope that further legislation will be passed before this.

However, setting aside its imperfections, the Bill, basically, is sound, and intentions regarding it appear to be serious and honest. It is to be implemented as soon as possible. Smoke control areas are planned for the end of the year, and the remainder of the Bill should be in effect within two years. The passing of the Bill will tell those concerned what future practices and standards will be required of them, enabling improvements to be made ahead of target dates. So, at any rate, claimed Mr. Enoch Powell, Parliamentary Secretary, Ministry of Housing and Local Government, and we shall hope to see this claim vindicated.

We also welcome the clause which was added to set up a consultative Clean Air Council, and the Minister's declared intention of making good use of this Council. It should provide a useful means of securing effective consultation between the Government and those elements outside on whose co-operation the success of the whole policy depends, and of educating the public generally. We further welcome the news that the Government is to make an annual report to Parliament on the progress of the clean air policy—a report from the Minister on the whole progress of this policy, and not just a report on the work of the Council. We shall look forward to seeing this pledge fulfilled and trust that it will help to preclude any possibility of a return of the official apathy with which the whole business of tackling the air pollution problem has been dogged in the past. There is no room for that apathy. This year's toll of smog victims was one quarter of the 1952 death roll, but even so, 1,000 persons lost their lives—and that is precisely 1,000 too many.

No doubt the Minister will avail himself fully of the powers invested in him in another new clause adopted

enabling him to make regulations requiring instruments to be installed and used for measuring and giving warning of the emission of smoke. The purpose of this clause is to enforce measurement of smoke wherever and whenever practicable. We dealt in these columns last week with this question of measuring instruments, and we are glad of this indication that their use is to be widened and extended. As we said then, it remains to be seen whether the message which these instruments impart and the challenge which smog constitutes are accepted and turned to good account or whether they will merely provide food for conversation until it is too late. The passing of the Clean Air Bill as it now stands at least gives hope that talk will, in fact, turn to action before it is too late.

D.S.I.R. Progress

THE publication of the Report for the year 1954-55 of the Department of Scientific and Industrial Research serves as a reminder, if a reminder is necessary, of the extraordinary range of work undertaken by this organization. It affects not only our professional life but our home life, and often in quite an intimate fashion—the devising of new methods for testing the freshness of fish, for example, or of making wool shrink resistant. The report is interesting also in that it contains details of the working of the first financial year of the Department's five-year plan, and we note that in consequence of the steady expansion of the D.S.I.R. programme estimates for the year 1955-56 show an expenditure of about £6½ mill. compared with £6¼ mill. in 1954-55; similarly provision in the Ministry of Works votes for services to D.S.I.R. in 1955-56 is over £2 mill. against £1½ mill. in the year under review.

The report indicates two problems which give the Advisory Council continuous concern. The first is the striking of a balance between research and information and advisory work, it being felt that the proportion of staff effort given to advisory and related work is abnormally high and hinders the acquisition of new knowledge. The second important issue is that of limiting current research programmes to accord with available resources and their constant review and adjustment to meet changes in the relative importance of different objectives. 'To make resources available for new projects there must be unhesitating reduction or elimination of effort on projects which are less likely to yield valuable results . . . It is not sufficient to be satisfied that a project is of value. Many more projects of this nature exist than it is possible to undertake. The problem is which to select . . .'

Turning to our own line of country—fuel affairs—we find the Advisory Council recommending that the Fuel Research Station should maintain its position as 'a national centre for the study of fuel problems' free from political considerations and the pressure of sectional interests; that the Station should aim at becoming the central organization in the country for long-term basic research on fuel; and that it should usually not undertake applied research beyond the stage at which this can properly be transferred to other organizations engaged on fuel research. It is recommended that, on this basis, construction should be begun at the earliest possible date of a new Fuel Research Station, as a matter of first priority.

As a result of changes introduced into the programme of the Fuel Research Station during the last few years, about one-fifth of the total effort is now being applied either directly, or indirectly through investigations to improve fuel efficiency, towards reducing pollution of the atmosphere from the treatment and utilization of fuels and their products. In response to enquiries from industry about the possibilities of smoke elimination for hand-fired, forced-draught boilers, semi-automatic equipment has been devised and tested with satisfactory results and the report states that coal-fired and oil-fired central heating boilers are also receiving attention. Work is being done on the removal of oxides and sulphur from boiler flue gas by the use of ammonia which 'not only gives promise of operation at a cost much lower than the almost prohibitive costs of processes previously used, but by recovering the sulphur as ammonium sulphate it could make a useful contribution to the sulphur economy of the country.'

The Domestic Front

On the domestic front it has been found that 'the efficiency of the simple inset open fire, which gives heat to the room directly by radiation and to some extent indirectly by convection, is affected by the conditions of operation. For example, reducing the rate of burning coal in the fire increases the efficiency, sometimes by as much as one-fifth; a similar rise in efficiency can be obtained by the introduction of a chimney throat restrictor to cut down the rate at which air is drawn through the room and over the fire by the pull of the chimney. *Changing from coal to coke with a fire designed also to burn coke generally increases the efficiency by about one-third*' (our italics). 'Even with these improvements, however, the efficiency of the simple open fire is low, over half the heat value of the fuel being wasted.'

Since it will probably be many years before the 12 mill. (to quote the 1953 estimate) old-fashioned grates in use in this country are replaced by more modern types, the 'production of smokeless solid fuel that will burn easily in the older grates offers a means of substantially reducing domestic smoke emission.' The report goes on to outline experiments which have been undertaken on the production of reactive cokes from selected weakly caking coals by carbonization in ordinary gasworks equipment under conditions not far removed from present gasworks practice. 'With coals graded according to size, temperatures a little below those ordinarily used, and somewhat shorter periods of carbonization, satisfactory cokes for the old open grate have been produced. The yields of coke and gas per ton of coal treated were lower than usual at gasworks and the proportion of the coke obtained in small size (breeze) was greater, but the amount of coal carbonized per retort per day was greater.'

We have dealt with this section of the report at some length since it conveniently summarizes the type of work being carried out at East Greenwich and which, with its social implications, is characteristic of the efforts being made to make this a green and pleasant land.

Ideal Home Results

THE surprising and gratifying results achieved by the gas section at the Ideal Home Exhibition was the subject of a leader in our April 4 issue. We are now able to provide some details and show that, despite the more stringent hire purchase restrictions recently imposed on most appliances, results were ahead of those achieved at the 1955 exhibition. On the Gas Council pavilion the number of enquiry forms completed, at 1,432, was only two up on last year's total, but the number of appliances involved, 1,981, was 221 more. However, the cash forms completed totalled 1,121, covering 1,539 appliances (£45,000 worth), against 675 in 1955, covering 798 appliances. As is customary 60% of the enquiries received resulted in sales for the North Thames and South Eastern Gas Boards. On the Gas Council's home laundry stand in the gallery—a new departure—nearly 600 enquiries for gas-electric washing machines were received; this does not, of course, include wash boilers for which business was very satisfactory. On the ten manufacturers' stands which comprised the rest of the gas section, some 2,100 enquiries, embracing 4,000 appliances, clocked up a highly satisfactory volume of business.

How was all this achieved? Well, the manufacturers undertook direct selling, operated on dealers' discounts, and incidentally, employed between them 60 smart sales girls. But surely the short answer was that everybody really tried. Others please follow.

Crusader with a Crowbar

IN sales circles—and by that we mean Salesmen's Circles—the appearance of a new paper by Mr. R. J. Gregg, Publicity Manager of the Gas Council, is something of an event. For many years Mr. Gregg has been perhaps the most sought-after and prolific speaker at gatherings of gas sales staff, and happily his transition from private enterprise to state ownership has in no way stemmed the flow of wit and wisdom for which he is renowned. An an orator he has one outstanding virtue—he speaks his mind. He attacks his subject in the voracious manner of a bull-dozer. Diplomacy and finesse are cast aside. When, as not infrequently happens, he attacks something or somebody, it is as an assassin rather than a duellist; he will not use a stiletto when a bludgeon will do, and will crack even the smallest nut with a crowbar.

The other characteristic of Mr. Gregg's approach to public speaking is an inability to resist a potential wisecrack. The result is that among the less discerning his fame rests as much on his entertainment value as on the home truth which he propounds. At heart he is a serious person, far more of a crusader than a comedian, and in an industry surprisingly lacking in larger-than-life characters, R.J.G. is a one-man phenomenon, and, as far as sales staffs are concerned, the personification of salesmanship. These thoughts came to mind when we visited Reading last month to hear him address the combined Southern Circles. His paper was called 'The Uncommercial Travellers,' and most of its essence is to be found in the April issue of 'GAS SERVICE and Domestic Coke.' No doubt Mr. Gregg will be invited to repeat the performance on another series of 'one-night stands' in other areas, but if he does so we hope that as well as enjoying the jokes his listeners will lend an ear to the underlying message which is as disquieting as it is true. The substance of his paper is contained in this quotation: 'This is no time for uncommercial travellers who just do not *want* to know what is going on, or for the manufacturers who squawk at large about the industry letting them down rather than facing up to their own weaknesses. We are all here to sell one thing—gas—which, like anything else, cannot be made economically unless you *can* sell it, and of course the more you sell the cheaper it will be to make. There is nothing new about the present economic squeeze; maybe we did not learn our lesson in the past and have forgotten that the harder the times, the harder you must hit back on the sales and publicity front.' As far as hitting back is concerned, few will deny that Mr. Gregg, as a publicist, is doing his fair share.

Steel Industry Needs Coke

THE British Iron and Steel Federation is anxious about the adequacy of coke supplies. The further development of U.K. steel production in the 1960's will be placed in jeopardy unless users at present burning coking coal for unessential purposes convert to other fuels on an increasing scale over the next five years. So says the Federation's journal *Steel Review*. The article goes on to explain that nearly three-quarters of the fuel consumed by the iron and steel industry is coke used for the production of pig-iron in the blast furnaces—over 20 mill. tons of coal equivalent last year. The bulk of the increase in steel production in the future, says the article, will be based on pig-iron, in the ratio of about 7 tons more pig for every 9 tons more steel. The industry's primary dependence on supplies of coal of coking quality will therefore increase, despite the substantial economies in the use of coke effected in recent years.

The amount of coke required to produce a ton of iron has in fact been reduced from 36.5 cwt. of coal equivalent in 1945 to 31 cwt. last year. Furnace trials using 100% sinter have, the article says, shown coke rates very close to the theoretical minimum. The proportion of sinter to total ore consumed has doubled over the past ten years to 34%. The industry itself has brought about substantial fuel economies in many other ways. In the last seven years total fuel requirements have risen by 14% to a consumption of 250 mill. tons of coal equivalent in 1955. Steel output went up by 33% in the period, however, while the increase in coal consumption was only 8%. This is the result of large increases in the use of other fuels, including fuel oil, tar and creosote pitch. In addition the consumption of coke oven gas and electricity has gone up substantially.

B.S.S. FOR INSULATING MATERIALS

THE British Standards Institution announces the publication of a revision of the British Standard for 'ready-to-fit' thermal insulating materials for hot and cold water supply and central heating installations for small dwellings (B.S. 1304: 1956).

B.S. 1304 relates to thermal insulating materials suitable for use with the hot and cold water supplies and central heating installations of small dwellings having a water heater rated at not more than 55,000 B.Th.U. per hour. Thermal performance is related to a specified minimum thickness of insulating material based on the manufacturer's declared value of conductivity. The method of measuring thermal conductivity used by the National Physical Laboratory is described in detail, and a list of relevant Codes of Practice is given.

Methods of insulating cylinders, tanks and cisterns, incorporating the use of granular or flocculent materials within casings built up *in situ* are outside the scope of the specification. Further information on pre-formed materials will be found in B.S. 1334, and on flexible materials in B.S. 1589.

B.S. 1304 may be obtained through the Sales Branch of the British Standards Institution, 2, Park Street, London, W.1. Price 3s.

Personal Notes

SIR BERNARD KEEN and MR. A. G. P. POWELL have been elected to the board of Baird and Tatlock (London), Ltd., and MR. W. C. JOHNSON, M.B.E., and MR. H. N. RICKETTS have been elected to the Board of Hopkin and Williams, Ltd. Sir Bernard Keen joined Baird and Tatlock (London), Ltd., in 1955 as Chief Scientific Adviser and in January, 1956, took charge of the Research and Development Division. Mr. Powell joined Baird and Tatlock (London), Ltd., in 1924 as Sales Representative in the North of England and became Sales Manager in 1935. Mr. Johnson joined Baird & Tatlock (London), Ltd., in 1922 and became Chief Chemist of Hopkin and Williams in 1936. Mr. H. N. Ricketts joined Hopkin and Williams, Ltd., in 1925 and became Works Manager in 1937.

MR. FRANK LOCHHEAD, Superintendent, gas fitting and maintenance, Scottish Gas Board, Glasgow District, retired on April 6 after 45 years' service in the gas industry. He joined the Glasgow Corporation Gas Department in 1910, and was appointed Superintendent in 1948. His father and grandfather were also in the industry and he has a brother with the Scottish Gas Board in Glasgow. Between them they have given 160 years' service to the industry.

MR. CHARLES W. LUDBROOK, Adviser to the Construction Manager of Ashmore Benson Pease and Co., Ltd., Stockton-on-Tees, has retired after 53 years with the firm. He began with the firm as an apprentice, and rose to be Construction Manager, before being appointed Construction Adviser, two years ago. Mr. Ludbrook has received a presentation from the staff and workmen.

SIR COLIN CAMPBELL, O.B.E., of Plymouth, has been appointed Chairman of the South Western Gas Consultative Council as from May 12, 1956. Sir Colin was formerly Town Clerk of Plymouth. The present Chairman of the Council is Alderman A. W. Loveys whose appointment expires on May 11.

MR. W. HYDE has been appointed Internal Auditor and Methods Officer of the Southern Gas Board. MR. G. C. YORKE and MR. B. G. H. CLEGG are to be Solicitor and Statistician respectively from some time during May.

MR. W. L. M. O'CONNOR, C.B.E., has been elected Deputy-Chairman of the Imperial Continental Gas Association.

MR. H. R. WALTON, Sales Manager of Fisher Governor Co., Ltd., has been appointed a Director.

Obituary

MR. J. H. HORNBY, who died recently after a very short illness, was Manager of the Hastings Group of the South Eastern Gas Board when he retired at the end of September, 1953. It may be said that he was born into the industry which he served for 43 years, and in which his father had held important appointments. Mr. Hornby joined the Ilford Gas Company in 1910, and two years later went to Grays and Tilbury. In 1914 he went to France with the Queen Victoria Rifles, was wounded, taken prisoner of war in August, 1918, and returned from Germany in November, 1918. His associations with Grays were then resumed, and he stayed to see the works coupled to Beckton in 1931. Mr. Hornby then went to Brentwood as Station Engineer, and carried out the work necessary to connect the works to the Grays high pressure system. In June, 1933, he was appointed Engineer and General Manager of Maidstone, controlling the Charing, Wateringbury, Cranbrook and Tenterden Companies as they were taken over by the South Eastern Gas Corporation. In September, 1939, he was appointed Engineer and General Manager of the Hastings and St. Leonards Gas Company, but, owing to the outbreak of war, remained at Maidstone until March, 1940. A member of the London and Southern Junior Association, Mr. Hornby was elected associate member of the Institution of Gas Engineers in 1921, a full member in 1932, and a member of the Southern Association of Gas Engineers in 1933.

Diary

April 19.—NORTH WESTERN G.C.C.: Salford Town Hall, 2 p.m.

April 19.—WALES AND MONMOUTHSHIRE JUNIORS: Annual General Meeting, Metropole Hotel, Llandrindod Wells, 2.30 p.m.

April 20.—MIDLAND SECTION, I.G.E.: Queen's Hotel, Birmingham. Annual General Meeting, 2.30 p.m. Preceded by luncheon, 12.15 p.m.

April 20.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Annual General Meeting. The Engineers' Club, Albert Square, Manchester, 2.30 p.m. Preceded by luncheon 12.30 for 1 p.m.

April 20.—NORTHERN JUNIORS: Special Speaker Meeting. Address by Mr. J. E. White, Deputy Chairman, Northern Gas Board. Newcastle.

April 21.—WESTERN JUNIORS: Annual General Meeting and visit to Taunton Gasworks.

April 23-May 4.—BRITISH INDUSTRIES FAIR: Castle Bromwich, Birmingham.

April 23-May 4.—BRITISH INDUSTRIES FAIR (ELECTRICAL SECTION): Olympia.

April 24.—MIDLAND JUNIORS: Annual General Meeting. Edmund Street, Birmingham. 6.30.

April 24.—INSTITUTION OF CHEMICAL ENGINEERS: 34th Annual Corporate Meeting and Annual Dinner, May Fair Hotel, London, 11 a.m.

April 24.—WOMEN'S GAS FEDERATION: 21st Annual General Meeting, Grosvenor House, Park Lane, W.1. 3.15 p.m. Chief Speakers: Her Excellency the High Commissioner for India, Madame Pandit, and Sir Harold Smith, Chairman of the Gas Council.

April 24.—MIDLAND JUNIORS: Annual General Meeting, West Midlands Gas Board, Edmund Street, Birmingham, 6.30.

April 24.—INSTITUTION OF HEATING AND VENTILATING ENGINEERS: Annual General Meeting. Paper, 'Simplified Design for Industrial Radiant Heating,' P. A. Coles. Lecture Theatre, Junior Institution of Engineers, Pepys House, 14, Rochester Row, London, S.W.1, 6.30 p.m.

April 25. — NATIONAL BENZOLE AND ALLIED PRODUCTS ASSOCIATION: Annual General Meeting, Grosvenor Hotel, Victoria, London, S.W.1. 2 p.m.

Correspondence

SILICOSIS HAZARD

DEAR SIR,

Your issue of April 4 contains a report of the inquest on a retort welder who was found at post-mortem to be suffering from silicosis.

It would be unfortunate if gas engineers were to infer from the reported comments of the coroner, the pathologist and the deputy works engineer, that the occurrence was unique and inexplicable. It has been known for some time that the occupations of retort welding and airborne sealing were associated with a silicosis hazard, and a number of cases have been detected in men who have done this work for many years, although, fortunately, severe disablement is rare.

The refractory cement used in retort welding contains 90.2% of free silica, 9% of which lies within the range of particle size of 1-5 microns. It is these fine particles which, inhaled over a period of years, may penetrate into the lungs and set up the characteristic changes which are detectable by X-ray as well as at post-mortem. Inhalation takes place chiefly during the transfer of the cement from its container, which is not uncommonly done manually with a scoop, and exposure is greatly increased if the cement is sieved in an open vessel before it is fed into the gun.

Prevention consists in doing everything possible to prevent the inhalation of the powder. Should it be necessary to sieve the powder before use, this should be done in a closed vessel which does not permit particles to escape into the air. A suitable dust respirator, such as the Siebe Gorman 'Dustguard,' is an additional precaution.

Yours faithfully,

F. H. TYRER,
M.A., M.R.C.S., L.R.C.P., D.I.H.
Chief Medical Officer,
West Midlands Gas Board,
Birmingham, 3.
April 10, 1956.

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. V. Nº 90—7th YEAR.] LONDON, APRIL 1, 1856. [Subscription per Ann. 15s. in Advance / 18s. Credit.] Price 8d. Unstamped.

LESMAHAGO GAS COAL

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coalfields (the most extensive and valuable in the parish of Lesmahago), respectfully intimates to the Managers of Gas Works and Consumers of Gas Coal, that he is prepared to ship the best quality of the above well-known COALS at Glasgow or Leith, and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas Coal Works, Lesmahago; or J H. Jones, 1, Poets'-corner, Westminster, sole Agent for London.

CARDIFF GAS[illegible] AND COKE COMPANY.

THE DIRE[illegible] are prepared [illegible] for 2000 yards of CAST-IRON SOCKET PIPES, [illegible] inches, 6 inches, 4 inches, and 3 inches, internal diameter. Specifications and particulars may be obtained upon application at the Company Offices, Cardiff.

Sealed tenders, addressed to the Chairman of the Directors, to be forwarded, under cover, to the ENGINEER of the works, on or before the 9th day of April next, endorsed "Tenders for Pipes." The lowest or any tender not necessarily accepted.

By order, HENRY BOWEN, Engineer.
Cardiff, March 26, 1856.

PADDON AND FORD,
PATENT GAS METER & APPARATUS WORKS,
GRAY'S-INN-ROAD, LONDON,

Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, GAS STOVES, and LANTERNS.

Contractors for the erection or alteration of Gas Works; and every description of Apparatus required in Gas Works supplied.

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GENERAL [illegible] AGENT,
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Contracts made for all kinds of Cast and Wrought Iron Gas and Water Apparatus, Clay Retorts, Fire-Bricks, Coals, &c.—Prices, and Lists of Freights and Carriage, sent on application.

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Beg to intimate that they have erected extensive Works for the MANUFACTURE of every description of GAS RETORTS, FIRE-BRICKS, LUMPS, &c.

The Clay having been proved (by analysis and the application of extreme heat) of FIRST-CLASS quality, they can confidently recommend it.

UNEXCEPTIONAL REFERENCES given, and orders NEATLY and QUICKLY EXECUTED.

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WANTED to Purchase, a Station-GOVERNOR, with 10-inch inlet and outlet, to replace one with 6-inch connections; the latter to be sold cheap.

Persons desirous of supplying the new Governor are requested to send plans and specifications, with the price delivered at Dover, to

March 25, 1856. R. H. JONES, Secretary

WANTED, a Wet-Lime Purifier, with gear complete, of about 8 feet diameter, and 3 feet deep.—Address, J. and J. MEAD, Penryn, CORNWALL.

TO GAS COMPANIES AND OTHERS.

THE Advertiser, who has had 20 Years' experience in Gas-works, Main-laying, and Gasfitting, and has a thorough practical knowledge of Reading, Cleaning, and Adjusting Meters, and has been sole manager of the Oakham Gas Works for the last six years, is anxious to engage as MANAGER or SUB-MANAGER, INSPECTOR, &c.—Address, WILLIAM VICKERY, Manager, Gas Works, OAKHAM.

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ENGINEERS, IRONFOUNDERS,
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Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY"

J C and Co. have been for many years the most extensive Manufacturers of Fire Clay Retorts in the United Kingdom; and orders for Fire Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their [illegible] works as above

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Original Manufacturers of Wrought-Iron Gas Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Boilers, have been awarded the FIRST PRIZE in the Great Exhibition of Paris for these Articles.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

The eminent Engineer, Mr. Perkins, confines himself altogether to the use of John Russell and Co.'s Tubes in High-Pressure Patents.

[illegible] and [illegible] kinds of [illegible] Cups, Gas [illegible] Tutes, &c.

N.B All Goods thoroughly Tested before sent out, and Warranted.

VOL. IV. of the JOURNAL of GAS-LIGHTING for 1855, is now ready for delivery, price 15s, bound in cloth and lettered. Cloth backs for binding, 2s. 6d. each. A few copies of Vols. II. and III. are also still on sale.

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TO GAS COMPANIES

TO be Sold, Four Dry Lime Purifiers, each 13 ft. 2 in. long, by 4 ft. 2 in. wide, inside, divided into Three Compartments, with Three Tiers of Trays in each. These have only been in use since 1847, and are removed to make room for larger ones.—For particulars apply to the MANAGER, Gas Works, CARLISLE

March 12, 1853.

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Beg most respectfully to announce that, in addition to the continued manufacture of GAS METERS, they manufacture Meters for measuring Water, Spirits, &c. (commenced under Patent, in 1849, by the late Mr. William Parkinson).

N.B. These Meters are as simple and durable as the Gas Meter, and as correct as that instrument under the most careful manipulation.

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A Young Man, who has for Six Years been employed in a large Provincial Gas-Work, as ASSISTANT METER REPAIRER, is desirous of obtaining a similar situation; or he would have no objection to engage with a small Work as Meter Repairer and Inspector. Good character, &c., can be furnished from his late employers. For further particulars, address P S., care of Mr. W. B. KING, Office of this JOURNAL, 11, Bolt Court, Fleet Street, LONDON.

TO IRONFOUNDERS.

THE Committee of the Doncaster GAS COMPANY are prepared to receive TENDERS for the undermentioned CASTINGS:—Eight lengths of Hydraulic Main, 40 Retort Mouthpieces, 40 Lids, 40 Ascension H and Dip Pipes, Sundry Furnace Doors and Frames, Buck-staves, Furnace Bars, &c. Drawings and Specification for the above may be seen on application to Mr. Henry Gore, Gas Engineer, 25, York Place, Leeds. Tenders are to be forwarded, on or before Wednesday, April 9, 1856, addressed to the CHAIRMAN of the GAS COMPANY, Doncaster.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS,
NEAR NEWCASTLE-ON-TYNE.

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begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

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TO be let by Tender, from Midsum-MER next. For further particulars apply to Mr GEO S WHITE, the Secretary.

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TO be Sold, a number of 18-inch, 15-inch, and 12½-inch Dee-Shaped Retort Mouthpieces and Covers, with Flange-pipes to fit, being part of the surplus stores of the Woolwich Equitable Gas Company Price £5 per ton. Apply to Mr. G. HUDSON, Secretary, WOOLWICH.

KAY'S Patent Equitable Gas-Meter. The attention of Gas Companies is requested to the above Meter as an efficient preventive of fraud by "tilting," so often resorted to by dishonest consumers.

Manufactured only by WM. COWAN, 60, Buccleugh Street, EDINBURGH.

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C[illegible] AND [illegible] GAS ENGINEER.
Office—DARLEY STREET, BRADFORD.

C. C. begs to inform Gas Companies that he continues to supply Plans, Specifications, and Estimates of Outlay, and may be consulted on all matters connected with Gas. Companies wishing to lease off their Works for a term of years may receive liberal proposals on application to C. C.

TO GAS & WATER COMPANIES, ENGINEERS, SURVEYORS, &c.

THE Swansea Local Board of Health are prepared to Dispose of about 2000 yards of 12 to 16 inch New Cast-Iron Socket-Pipes, together with a number of Junctions and other Castings. The whole are of the best description, c[illegible]ated by Dr. Angus Smith's patented process, and were supplied by the eminent firm of Cochrane and Co.

For further information apply to Mr. JOHN NEWTON, Resident Engineer, Guildhall, SWANSEA.

Swansea, March 18, 1856.

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CIVIL AND CONSULTING GAS ENGINEER.
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EIGHTON MOOR GAS COALS.—Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

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THE Filey Water Company are prepared to receive TENDERS from parties willing to contract for LAYING about FIVE MILES of WATER-PIPES.

The Specification may be seen at the office of Mr Josiah F Fairbank, of Scarborough, the Company's Engineer, on and after Monday, March 31, 1856.

A printed copy of the Specification, with Form of Tender, will be forwarded on receipt of 5s.

Sealed Tenders, addressed to the Directors of the Filey Water Company, and endorsed "Tenders for Pipe-laying," must be forwarded under co er to the Engineer of the Company, on or before April 10, 1856.

The Directors do not bind themselves to accept the lowest or any Tender.

JOSIAH F. FAIRBANK,
Engineer and Secretary to the
Filey Water Company.

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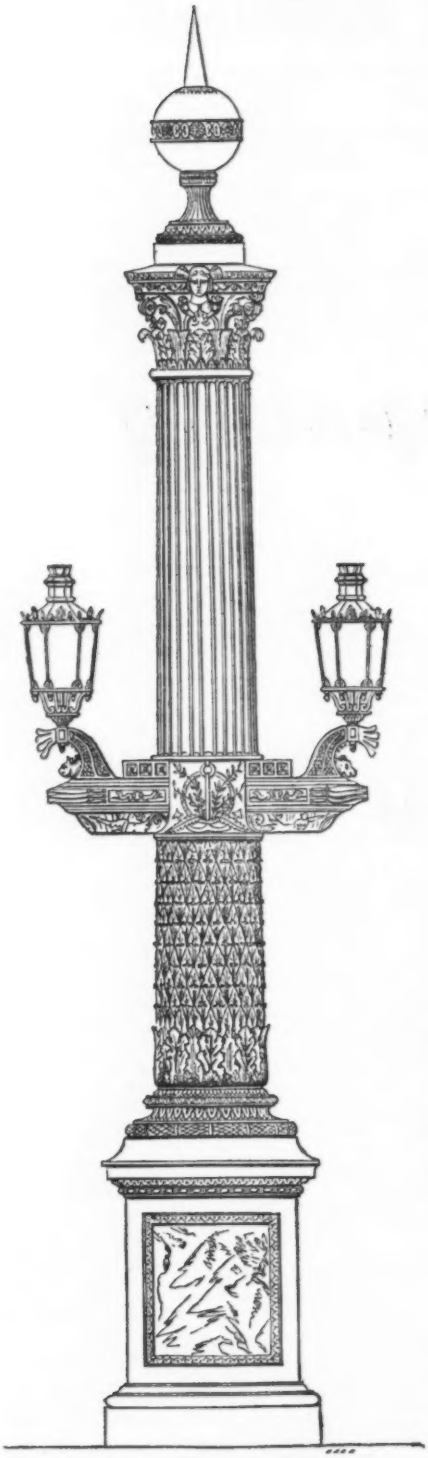
100 years at Bolt Court

The New Look—*Then*

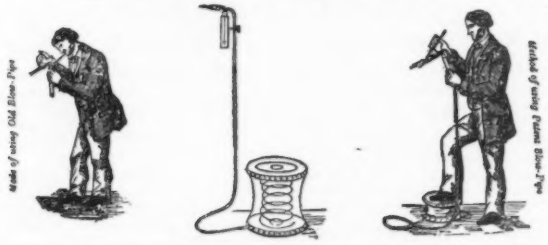


While London heartlessly sweeps away relics of gas street-lighting, Paris, recognizing her gas-light pillars as 'objets d'art,' is preserving those in the Champs Elysées for posterity. Pictured above is one of the even more impressive pillars of the Place de la Concorde.

BY HER MAJESTY'S ROYAL LETTERS PATENT

DAVIS'S PORTABLE ATMOSPHERIC BLOW-PIPE,

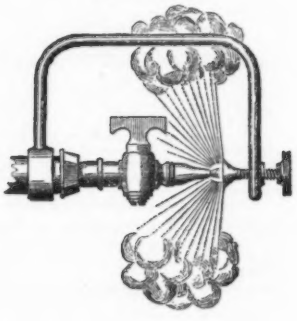
MANUFACTURED BY DAVIS AND SON, 12, WALCOT STREET, BATH



This invention was specially recommended for gas fitters, plumbers, jewellers—and dentists!

This two-foot-long, 180-ounce, £200 silver épergne was presented to Lewis Thompson for 'indefatigable researches and ingenious investigations into the properties of coal and the processes used for its distillation.'

Above: The turn of a tap converted this argand into a single-jet burner.
Below: An invention for producing 'Scotch mist.'



Chief sales point of these stoves was:

NO CHIMNEY REQUIRED

FOUR GENERATIONS

LIKE the stately homes of England, the premises of old-established businesses in this country are not always tenanted today by the families which built them in the past. Two world wars, a social revolution, and the ever-mounting demands of successive Chancellors of the Exchequer have taken their toll of both. Nationalisation, too, has had its way with the family business.

So we feel—not, perhaps, altogether without justification—a little pride in celebrating, this month, the centenary of the first association with the 'GAS JOURNAL' of the King family in whose hands, despite four take-over bids, it still remains—hence King's Rhapsody.

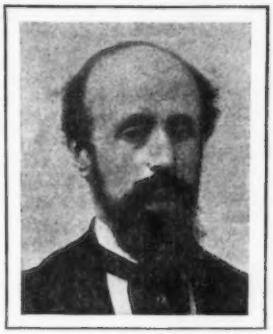
For just 100 years ago the name of William Boughton King, grandfather of the present Managing Director, featured for the first time as Publisher of the 'JOURNAL.' This followed a letter dated February 6 of that year—still in the possession of the King family—addressed to W. B. King by Thomas Greaves Barlow, then Editor-Proprietor of the 'JOURNAL', offering him charge of the advertising and publishing department on a commission basis with reporting on a lineage basis.

Some idea of the success with which W. B. King tackled these all-embracing duties may be gleaned from the fact that 12 years later an agreement was signed between the two men granting him sole licence to publish and vend the 'JOURNAL' in consideration for the payment to Barlow of £480 a year and a retainer of £240 a year for as long as the 'proprietor' chose to remain the Editor.

With Barlow's death four years later in 1872, King, himself, became Editor, and after a further two years, had stepped up publication of the 'JOURNAL' from twice a month to once a week. Once at the reins, it may truthfully be said, he never looked back. Indeed, at the time of his death in 1878, at the age of 57, he had more than doubled the output from 11, Bolt Court.

Control of the 'JOURNAL' then passed into the hands of Walter King, his son, then aged only 26 and with but seven years' experience in the business behind him. Despite these handicaps, however, the youthful new Editor kept the 'JOURNAL' firmly on its upward course, and six years later, the paper was averaging 48 pages an issue.

Like his father, Walter King was a glutton for work. His was a seven-day week, for even Sundays were spent checking proofs at home in readiness for the morrow's press day. In addition to these seemingly whole-time routine activities, he travelled constantly throughout the British Isles, making not infrequent business visits to the Continent as well. Small wonder that his name became a household word in the gas industry! In 1895—by which time he had added printing to his other activities—he redeemed the Barlow interest in the 'JOURNAL' which then passed wholly into the hands of the King family.



W. B. King.

Walter King.

W. Rupert King.

Up to the outbreak of the first world war, Walter King piloted the 'JOURNAL' from strength to strength. Indeed, 1913—during which its pages numbered 4,000—was, perhaps, the peak year in its history. During the difficult war years he battled to preserve his heritage, perforce abandoned by his elder son, Rupert, who had joined him in 1912. This long and lonely struggle ended in a decisive victory for him but it took its toll on his health, and he died in 1922.

Some insight into the esteem in which he was held, the rôle which he played and the valuable contribution which he made to the gas industry is to be gained from the words of Thomas Hardie, then President of the Institution of Gas Engineers, at the Institution's annual meeting in the year of his death. 'He has wielded a great power in the interests of our industry,' said Hardie. 'He was a man of sound judgement, a clever analyst of both words and figures, quick to separate the sound from the base; and he never failed to keep before us the matter so helpful to our progress. He was a friend, indeed, to many of us; and there are few in this room who do not feel his death as a personal loss.'

At this time, his younger son, Clifford—present Chairman and Managing Director of the Company—had, after his war service, only two years' acquaintance with the business, and the Editorship passed into the more experienced hands of A. F. Bezant, who, with him, became Joint Managing Director. This was a logical sequence since Bezant was a shareholder in the firm which had finally been registered as Walter King, Ltd., the previous year. Early in his régime, with realism and foresight, Bezant initiated 'THE GAS SALESMAN' as a supplement to the 'JOURNAL.' This was an immediate success, and flourishes today as 'GAS SERVICE'.

Though he was able to return to Bolt Court for a time after the end of the major hostilities, the lesser wars which followed in their wake took Rupert King away again until 1929, when he returned to become Editor of 'THE GAS SALESMAN', now to be raised to the status of an independent magazine. In 1934, Alfred Harrison, who had taken over on the death of Bezant, decided to retire, and Rupert assumed full editorial responsibility. Four years later, he and his brother effected the first big change in format of the 'JOURNAL' which had remained, since its launching 80 years previously, as it is reproduced on the outside cover of this supplement.

Then came the second world war during which, his younger brother again in uniform, Rupert King removed the offices to Esher and carried on in the face of the many difficulties which beset all life and not least the business of publishing a technical journal, with text cut to ribbons and advertisement space tightly rationed. Reunion and the return to Bolt Court in the autumn of 1945 were marred by the tragedy of Rupert King's death at the early age of 54.

The present Managing Director looks back at the last ten years as the most difficult since he joined Walter King in 1920. Even as this article was being prepared, an industrial dispute had, for the second time in six years, halted production of a paper which between 1849 and 1950 had missed only one issue.

What of the future? The family tradition goes on: Philip King—fifth in the line—is Northern Manager with seven years' experience behind him. Meanwhile, we face the future with confidence. The industrial life of the whole country is still beset by difficulties; but the post-war winter harvest of financial crisis and labour strife will not go on indefinitely. In time stability and easier conditions will return.

1856 And All That

SINCE we are delving into the past, let us take a look at our publication of just 100 years ago. Among the personal column advertisements C. E., of Chepstow, Mon., tells parents that 'A very favourable opportunity now offers itself' for a youth to be apprenticed as a gas, water, and sanitary engineer. C. E. knew what he wanted all right—a young man who was not only active, intelligent, and aspiring, but in addition, prepared to work out of doors, and having (and this was essential) a natural taste for surveying, levelling, drawing, chemistry, and general mechanics. And parents who were willing to fork out 250 guineas for his apprenticeship!

This seems a tidy sum for those days when a guinea was a guinea, and a golden guinea at that—even though the exercise of a parental interest over the lad was promised—especially in the light of salaries offered to trained members of the industry. For example, in the same issue we find the Londonderry Gaslight Company offering a mere £70 per annum for a qualified person.

Perhaps the work involved would not be too arduous? Well . . . Take a look at the more detailed advertisement of the Ormskirk Gaslight Company. This establishment sought someone prepared to 'undertake the Manufacture of Gas, the Care of the Plant, the Care of the Consumers' Meters and the Repairs of them; the Laying of Mains and Services throughout the Town, *and to fill up his time in Fitting*' (the italics are ours).

Something of a breath-taker is an insertion by a firm of appliance manufacturers. It informs the reader that 'Kimberley's PATENT GAS APPARATUSES consist of Eighty-nine patterns, sizes, and varieties of GAS HEATING STOVES, twenty kinds of Gas Cooking Ranges, Counter, Greenhouse, Bed-room, Office, Shop, Warehouse, Church, and Hall Stoves; Lacquering, Boiling, Steaming, Stewing, Ironing, and Griding Stoves; Ovens, Baths, Liquor, Shop, and Ornamental Stoves . . .' The manufacturers claimed that their stock was 'the most extensive ever attempted before'—or since, one feels tempted to add. (And can anyone remember when the last Griding Stove came off the assembly line?)

Some idea of the public distrust of those days in the new-fangled and sinister Carbonin Gas can be drawn from the advertisement describing Mr. J. O. N. Rutter's booklet, *The Advantages of Gas in Private Houses*, intended for free distribution as propaganda by gas companies. 'The present high prices of tallow and oil are favourable to a more general adoption of gas in private houses,' the advertisement reads. 'Let its advantages, as yielding a pure, cheap, and healthful light, be properly explained, and there will be no difficulty in getting over a few old-fashioned prejudices. Those persons who have experienced the benefits of gas-light never go back to candles or lamps.' It was getting them to take the plunge and submit to the initial experience that appears to have been the stumbling block in the way of progress. The book, which could be had at £5 per thousand copies, was then in its 128,000th edition, so clearly Mr. Rutter helped to spread the light in a big way.

Harsh Things Were Said

Looking beyond the advertisements, we find that there was a first-class row going on between Mr. Thomas Edwards, of the Liverpool United Gas Company, and a Mr. Frederick Taunton over the testing of gas meters. These two gentlemen entered into a lengthy—but *lengthy*—correspondence in which they said some pretty harsh things about each other. For our part, we evidently considered their differences of sufficient interest to publish their correspondence *in toto*, and ourselves to produce three columns of editorial comment on the subject—and that at a time when 'We had hoped that our readers had heard the last of the recent gas agitation in Liverpool.'

Gas meters were a source of endless bother to everyone in those days. There were wet meters and dry meters, and pretty well all of them seem to have shared a tendency to be incapable of functioning for more than 24 hours or so without starting to run either fast or slow—or, we may suppose, 'packing up' altogether. Many of the new patents of the day—described in detail in our columns—were for inventions to improve meters, wet and dry, and all of them claimed to have overcome once and for all one or more of the intractable difficulties inherent in these tricky pieces of mechanism.

One interesting invention for which a provisional patent had just been granted 100 years ago was a portable apparatus for heating water or other fluids by gas. This advanced and cunning device was fitted with a flexible rubber tube to supply the gas, and sundry other tubes, flexible and rigid, to supply air to the burners and draw off the products of combustion, so that the whole box of tricks could be plunged into a bucket or other vessel containing the water—or other fluid to be heated—and hauled out again when the desired temperature had been attained (not, of course, forgetting that the gas should be lighted first). A pretty revolutionary piece of thinking for those days, or els, even if the idea is commonplace today.

Prince Visits Gasworks

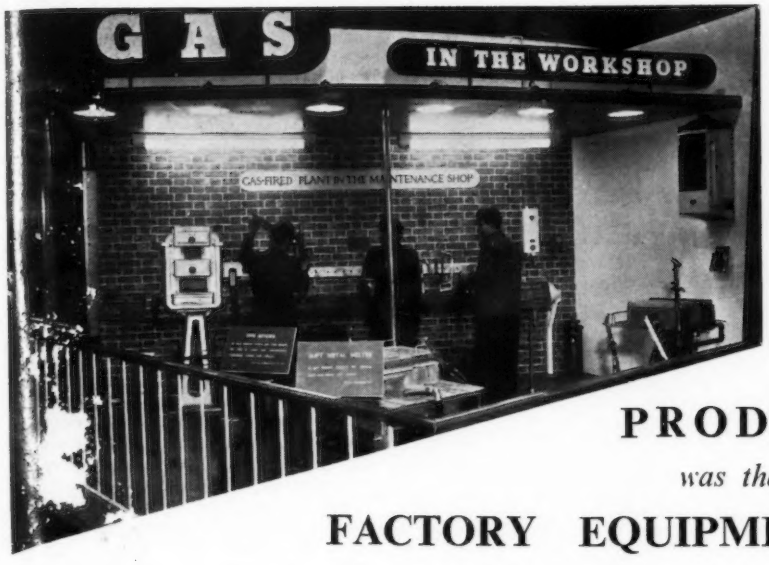
What of the news? Royalty, we find, had just paid its first visit ever to a gasworks when the then Prince of Wales spent what appears to have been a happy hour and a half going over the plant of the Chartered Gas Company, much of it watching the 'fiery and indeed, fearful operation called "drawing the retorts."' In an editorial, we were high in our praise of this valued Royal interest in the industry and contrasted it with 'the singularly corrupt Legislature obviously intent upon crushing the industrial avocation of the people beneath the exotic heel of centralisation.' This quip was directed against the sanitary officer, who was out, we suggested, to prove that in addition to their lawful occupation, manufacturers of gas also produced 'cholera, typhus, and all other "ills that flesh is heir to".' Indeed, in another editorial in the same issue, under the heading: 'The Threatened Trade Inquisition,' pursuing the same theme, we deplore the Smoke Nuisance Abatement Act and point out that we have 'again and again, in this Journal', contended that smells given off from any process of trade, even though they may be offensive, are not therefore necessarily noxious . . .' Ah well, that was before the word smog had floated into our vocabulary!

Gas seems to have featured rather prominently in the law courts of those days. One naïve little action highlights the changing times through which the industry has passed. A certain merchant and miller stood indicted in the Crown Court, Huntingdon, on charges of stealing gas from the St. Neot's Gas and Coke Company. This company's foreman had discovered that pipes supplying seven lights on the business premises of the accused had been inserted by him into their main service-pipe before it reached the meters. Counsel for the defence argued that 'the placing of these pipes where they were was nothing more than an error; and, after having called witnesses, who gave the prisoner the highest character, the jury returned a verdict of 'Not Guilty.' We should like to see anyone getting away with an error like that today!

While this was going on in Norfolk, a gas meter manufacturer was being sued in London by a former employee who alleged that his late master had caused him to be wrongfully charged with embezzlement and wrongfully imprisoned.

The gas meter manufacturer brought his brother along to court together with sundry other members of his staff, and they all gave some pretty convincing evidence to show that the charges of embezzlement and the imprisonment had been anything but wrongful. But, alas, they all contradicted each other on material particulars, and the gas meter manufacturer had to pay his late employee £5 damages.

Finally, a whip round the news brevities of the day: An effigy of the Gas Manager of the Great Central Gas Works was burned on Bow Common one night by disgruntled workmen whom he had sacked; the Imperial Gas Company had started work on a 'Monster Tank'; Melbourne, Australia, had just got gas-light, and Gibraltar was considering the desirability of following suit; and the total and incredibly swift destruction by fire of Vauxhall Railway Station one evening was believed to have been 'occasioned in some way or other by gas.'



Gas Council Stand was a strong attraction at the world's most comprehensive display of factory services

PRODUCTIVITY

was the theme of the

FACTORY EQUIPMENT EXHIBITION

DESIGNED as the spearhead of the drive to modernize Britain's 214,00 factories and workshops, the fourth Factory Equipment Exhibition, held last week at Earl's Court, had as its theme 'Productivity.' It is claimed to have been the most comprehensive display of factory equipment and services ever held under one roof—a claim which probably no visitor to the exhibition would care to dispute.

Keeping in mind the fact that efforts to boost productivity can be hamstrung by inefficient maintenance and slow-moving repair services, the Gas Council gave special prominence on their stand to the part that gas can play in a factory's on-the-spot repair and maintenance shop.

Complete with work-bench and tools, this demonstration 'shop' was furnished with such vital equipment as a brazing hearth; a small oven furnace for general heat treatment; an incandescent heat furnace for hardening and tempering; a pipe and bar bender; and a soldering iron heater. On show also, though not operating, was a metal-melting furnace.

Also displayed were models illustrating the harnessing of gas for high or low temperature radiant heat processes in various industries. A radiant heat tunnel, with conveyor, by Thomas De La Rue and Co., Ltd., featured prominently on this part of the Gas Council stand. (This company had an imposing display of oil-fired equipment on their own stand.)

Seen for the first time, two new Ballard box ovens were on show on the Gas Council stand. These incorporated such features as safety explosion relief panels, explosion locking handle, thermo-magnetic flame failure valves, interchangeable gas feed, and other special features.

As a separate part of the Gas Council stand was a well-laid-out display of industrial catering, water heating and space heating equipment, which included the recently launched special heavy duty 1790S solid top range by Benham and Sons, Ltd.

Much satisfaction at the interest aroused by the display was expressed by those in charge of the stand. The type of enquiry received at this exhibition is, in the nature of things, very different from that encountered, for example, at the Ideal Home Exhibiton, and on-the-spot orders are not to be looked for. However, considerable business is expected to result from the enquiries that were received.

Hot spot of the exhibition—and a very fine display into the bargain—was the Radiant Heating, Ltd., stand. There was a complete range of factory heaters on show—and all of them seemed to be operating at full boost! They included overhead radiant heaters for offices, canteens, workshops, and outside heatings, as well as this company's burners which operate in any position and have their application in radiant tunnels, foundry mould dryers, paint dryers, glass annealers, etc. Also in evidence were their grills and toasters for works canteens, Duoflam burners for water tanks, and hot water and steam boilers. A newcomer to this firm's overhead radiant heaters is the Mastertherm Midget, rated at 20 cu.ft. per hour, designed to fill the needs of the shop and smaller workshop.

Another notable display was that of Harris Engineering Co., Ltd., where their gas unit heaters, both direct and indirect, were to be seen, and their Schwank

(*Concluded overleaf*)

This De La Rue stoving tunnel exhibited on the Gas Council stand consisted of 24 Potterton gas-fired infra-red panels, 12 mounted vertically on each side of the tunnel, and was designed by De La Rue to stove 18 sq. ft. of material per minute.

D

FACTORY EQUIPMENT EXHIBITION—From p.193

patent infra-red radiant heaters were in operation, to mention but a few of their products.

An excellent show was also put on by G. F. E. Bartlett and Co., Ltd. Represented were this company's well-known water boilers, Multipot industrial teapot and complementary washing unit, hot cupboards, cafeteria, steaming oven, boiling pan and porringer, and various other well-known appliances.

Thermostats for every phase of industry were displayed at the stand of the British Thermostat Co., Ltd. These included gas thermostats for domestic and industrial appliances, pilot flame safety devices, convector thermostats, dial thermometers, and excess temperature switches.

There was a wide range of the industrial safety products of Siebe Gorman and Co., Ltd., including gas detective apparatus, gas respirators, and oxygen resuscitation apparatus. Also featured prominently in the exhibition were a number of very good friends of the gas industry, including John Allen and Son (Oxford), Ltd.; Dunlop Rubber Co. Ltd.; Griflex Products, Ltd.; Honeywell Brown, Ltd.; George MacLellan and Co. Ltd.; Metropolitan-Vickers Electrical Co., Ltd.; Newton Chambers and Co. Ltd.; Rawlplug Co., Ltd.; and Warsop Power Tools, Ltd. In addition, there were displays by Campoflex Co., Ltd. Foster Instrument Co., Ltd.; General Electric Co., Ltd.; and J. C. Neville Ltd.

EASTERN SECTION VISITS AN UNUSUAL GASWORKS

Production Remote from Storage at Norwich

NEW techniques and the use of oil for gas production could give the industry a new lease of life, said Mr. W. K. Hutchison, President of the Institution of Gas Engineers, in Norwich last week. An end to the dependence on coal would provide freedom of action. The industry would be able to tell the Coal Board what it was prepared to pay for coal; it would be able to tell the public what it would have to pay for coke.

Mr. Hutchison was speaking to members of the Eastern Section of the Institution of Gas Engineers which preceded a tour of the St. Martin-at-Palace and the Bishop Bridge gasworks. The industry was going through a period of change, he said. The age of the old small unit with its powerful engineer manager was passing. The age of specialization had come. The training which it offered was second to none, and given the individual qualities which had built the industry up in the past, the 'door was open' to the gas engineer.

Mr. Hutchison congratulated the Eastern Section on past achievements, and wished them success in the future.

Responding to the President's toast, Mr. J. H. Greenacre, Chairman of the Eastern Section, agreed that the industry was undergoing inevitable changes. His section varied from the small country works manager to the man in control of the large distributing plant with many varying tasks. He hoped that those who followed would maintain the high standards and esprit de corps of their predecessors.

Mr. E. Williams, Norwich Divisional Engineer, commented on the amazing amount of work done by the Institution, and its contribution to progress in the industry.

Mr. R. A. Weston, General Manager, Norwich Division, who welcomed Mr. Hutchison, gave details of the afternoon's programme, and the party proceeded to the gasworks.

The Norwich set-up is unusual in that the production and wet purification plant at St. Martin-at-Palace works is remote from the dry purification and storage units at Bishop Bridge, the semi-processed gas being conveyed between the two points under vacuum. This is unavoidable owing to limitations of space.

Total annual coal consumption is 75,000 tons; coke sold, 25,000 tons; gas sold, 1,650 mill. cu.ft. Output of the vertical retort house was 345 therms per retort per day but with the addition of dilution producer gas, has been increased to 355. This is estimated to make an additional 6,000 tons of coke available for sale, as well as added gas, and to constitute a saving to the Board of 30s. to 35s. ton/carriage on imported coke.

St. Martin-at-Palace Retort House

The retort house, reconstructed in 1946, contains eight beds, eight retorts per bed, of modern settings, 40 in. major axis, capacity 4.6 mill. cu.ft. per day. The settings are at present being operated under minimum steaming conditions and high throughput, and the resulting high quality coal gas is being diluted externally with producer gas. Coke is discharged into duplicate gravity bucket conveyors having a capacity of 50 tons per hour each.

Waste heat recovery plant consists of two Spencer-Bonecourt boilers each capable of evaporating 700 gal. of water per hour and having adequate instrumentation. Water evaporated per lb. of fuel to producers is now 5.5 lb., against the previous figure of 5.7 to 5.8.

Graded coke bunkers of total capacity of 200 tons are served by Corts reciprocating screens. Two ACE debreezing-weighing-bagging units are installed to deal with sized coke.

One Simon-Carves vertical tube condenser, capacity 5 mill. cu.ft. per day is in use, while two Clapham vertical tube condensers, capacity 3 mill. cu.ft. per day, are retained for stand-by purposes. One Simon-Carves electrostatic detarrer, 3.3 K.V., 60 M/A., capacity 5 mill. cu.ft. per day is in operation, and one Simon-Carves static washer, capacity 5 mill. cu.ft. per day. As stand-by to this washer there is a Kirkham's 'Standard' centrifugal washer and a Dempster rotary washer-scrubbber, capacity 3 mill. cu.ft. per day.

All tar and liquor storage is above ground, total capacity 350,000 gal., while concentrated ammoniacal liquor is handled by Newton Chambers, Arca controlled, capacity 9,600 gal. of crude liquor per day.

No. 1 carburetted water gas plant, still used as part of the stand-by peak load plant, dates from 1897. Nos. 1, 2 and 3 plants are hand operated, and together have a capacity of 2 mill. cu.ft. per day. No. 4 is a fully automatic Humphreys and Glasgow plant having a capacity of 2.5 mill. cu.ft. per day. This plant is designed for high peak operation, and can produce 3 mill. cu.ft. of gas per day when required. The plant has a waste heat boiler and is complete with Roots exhausters, compensating gasholder, electrostatic detarrer, condenser, and Connersville meter.

Solid fuel steam generation plant consists of four Babcock and Wilcox boilers with chain grates designed for burning coke breeze. The present method of working in the retort house, with minimum steaming, has enabled the works to be operated solely on waste heat steam for the greater part of the year, and at present the solid fuel boilers are shut off, though one boiler is held on very slow fire for any emergency.

Normally all electric power is taken from the grid supply at 6,600 volts, and dealt with for A.C. power purposes through a 250 kva transformer, and for D.C. purposes through a 100 kW mercury arc rectifier.

Bishop Bridge Works

At Bishop Bridge one Waller Rootes type exhauster, steam driven by Reader engine, capacity 250,000 cu.ft. per hour is in use. A further similar set is to be installed this summer, and will replace the existing stand-by plant comprising one Waller four-blade twin exhauster, capacity 160,000 cu.ft. per hour, and one Bryan Donkin two blade exhauster, capacity 120,000 cu.ft. per hour.

Dry purification plant consists of two streams for coal gas, each comprising four elevated cast iron boxes. One stream 30 ft. by 30 ft. by 8 ft., the other 30 ft. by 30 ft. by 5 ft. 6 in. The capacity of the deeper set is 4 mill. cu.ft. per day, and of the other set 3 mill. cu.ft. per day. In the same house are the C.W.G. purifiers consisting of four elevated boxes 36 ft. by 24 ft. by 5 ft., having a capacity of 3 mill. cu.ft. per day. The C.W.G. is metered at St. Martin-at-Palace works.

Scottish Board Spend £258,896

IN FIRST THREE MONTHS OF 1956

FOUR-FIGURE projects totalling over a quarter of a million pounds, approved by the Scottish Gas Board during the first three months of the year, were reported to a meeting of the Scottish Gas Consultative Council held in Edinburgh under the Chairmanship of Sir Robert Nimmo.

Included in the total of £258,896 were the following divisional figures: South-East, £99,303; Lanarkshire, £85,319; Edinburgh, £26,600; Northern, £21,695; South-Western, £13,640; Central, £9,347; Glasgow, £2,992.

Fire Damage

The main item in the South-Eastern Divisional figures was one of £64,100 for the Falkirk District, being the estimated cost of repairs required following the recent fire, including retort fittings of a more up-to-date type.

The Galashiels district had a total of £7,800 for the provision of a supply of gas in bulk to Earlston from the Galashiels—St. Boswells main. The principal item in the Armadale district total of £6,643 was the provision of £3,300 for a central office for the area at Bathgate. In the Peebles district of the South-East Division £3,750 was provided to meet the cost of purifier alterations and repairs.

Office Alterations

The Edinburgh Division figures included £14,000 to meet the cost of alterations to office premises at 25, Waterloo Place. Proposals for the use of this office block included the relieving of overcrowding in the existing premises at 5, and 15, Calton Hill, particularly in the central office, accounts branch, and machine room, and the vacation of the temporary office acommodation at 13, Calton Hill. Provision would be made for a sales and service centre, accounts collection centre, medical officer's suite, and conference room.

The Lanarkshire Division total of £85,319 was made up as follows: Lanark County District, £7,163; Motherwell District, £9,348; Airdrie District, £4,358. Apart from £8,600 for repairs to No. 4 and 4a settings of vertical retorts at Uddingston, the proposals were almost exclusively for mainlaying projects on new developments, particularly in the East Kilbride area.

The provision of £7,000 for the resetting of four retorts at No. 2 bed at Paisley was the main item in the Western Division total.

'Homes and Gardens'—The Gas Stand

A shot of the West Midlands Gas Board stand at the Birmingham Mail's *National Trades' Homes and Gardens Exhibition, held at Bingley Hall, Birmingham, recently.*

South Eastern Gas Board—Power-Gas Isle of Grain Contract

THE Power-Gas Corporation Ltd., of Stockton-on-Tees, has received instructions from the South Eastern Gas Board to proceed with the construction of a Segas catalytic oil-gas plant to be constructed at the British Petroleum Co.'s Isle of Grain site in Kent.

The plant will have a capacity of up to 20 mill. cu.ft. per day of town gas and will supplement the existing supplies distributed through the grid system of the South Eastern Gas Board from Sittingbourne in Kent to Guildford in Surrey.

It will be the largest cyclic catalytic gasmaking installation relying solely on oil as its raw material.

This type of plant has previously manufactured gas from heavy oil at York and from heavy oil and light distillates at Sydenham. Other Segas plants are now being built in this country and in Europe.

The Isle of Grain plant will make use of refinery residual products such as heavy and light fuel oils, gas oil, light distillate and liquefied petroleum gases for manufacturing town gas and is expected to be in production by the autumn of 1958.

Offsite Engineering Worth £8 mill.

THE engineering of the offsite facilities required in connection with the £26 mill. expansion programme recently announced by The British Petroleum Co., Ltd., for increasing the rate of processing crude oil at Kent Oil Refinery from 4½ mill. tons to 7 mill. tons per annum, and also in connection with the aviation gasoline plant, has been awarded jointly to W. J. Fraser & Co., Ltd., and The Power-Gas Corporation Ltd.

The value of the work to be handled under this contract is of the order of £8,000,000.

UP go the wages UP go prices

STRABANE Urban Council has decided to increase the price of gas by 8d. per 1,000 cu.ft., bringing the price to 11s. 2d. and of coke by 10s. per ton.

The Council also decided to increase the wages of all adult employees by 4d. per hour, as from January 29 last, in accordance with an award of the Joint Industrial Council.

The Gas Manager (Mr. J. Lusted) said the increase in wages would amount to £361 in a full year, and their coal would cost £1,155 more. With the increased prices he hoped to make up the deficit of £510 by changes in the manufacture of gas.

Mr. A. Vaughan said at present the price of gas in Strabane was one of the lowest in Northern Ireland.

Lindsay & Williams Ltd., of Ashton Old Road, Manchester, 11, announce that their telephone numbers are changed to EASt 2686 (4 lines).

CAN £500,000 A YEAR BE ABSORBED?

Northern Gas Board's 'Herculean Task'

IN an attempt to absorb pay increases to its employees, which will cost an extra £500,000 a year, the Northern Gas Board is to introduce two new charges.

From the time of the next meter reading a charge for a minimum of five therms of gas will be made, whether or not that quantity has actually been consumed through credit or pre-payment meters.

The other new charge is of 5s., which will have to be paid in the near future whenever the services of a fitter are necessary for the adjustment and cleaning of burners.

The charges were approved in Newcastle on Monday by the Northern Gas Consultative Council. The Chairman, Alderman Joseph Hoy, stated that even with the enforcement of the new charges it could not be guaranteed that an eventual increase in gas prices would be averted.

Mr. E. Crowther, Chairman of the Northern Gas Board, in a letter to the Council, pointed out that consumers who at present used five or more therms in a quarter would not be affected.

'On Demand'

'A source of expense to the Board arises through the free "on demand" service for the regulation and adjustment of appliances in consumers' premises,' wrote Mr. Crowther. 'It is recognized that this service is greatly appreciated by consumers, and the Board is very reluctant to introduce a charge for it, but feels that circumstances compel this to be done. It is, therefore, intended to require a payment of 5s. payable at the time of the call, whenever a consumer calls for the visit of an appliance maintenance man.

'It should, however, be emphasized that this charge will not be made when the occasion of a call is to trace a suspected escape of gas or to locate or rectify a fault in the meter or service pipe through which the consumer is supplied.'

Mr. Crowther added that while these and other contemplated expenditure cuts could not be guaranteed to avert an eventual increase in the price of gas since further additional expenses—example, increased rail carriage charges—were apprehended, they would at least enable a decision to be postponed without an impossibly heavy loss accumulating in the Board's trading accounts.

'Surgical Operation'

Alderman Hoy said the Chairman of the Gas Board and his Deputy were carrying out a survey to see how far economies could be effected in order that an all-round increase in gas prices could be stemmed. He thought it would mean a 'deep surgical operation.' The minimum charge and the maintenance charge were the first suggestions. He told the Council it was faced with the choice of two evils.

'You have either to accept some amendment to the general privileges which have been enjoyed by the general body of gas consumers, or you have to face the fact that if you do not accept these suggestions there will have to be an increase in the price of gas immediately. Do not run away with the idea that even if you accept these suggestions there will not be a further increase in the price of gas. That will depend very largely on whether or not the Board is called on to meet a still further financial obligation if there should be a further increase in the price of coal,' he said.

The Board were attempting the Herculean task of holding the price of gas steady and absorbing the extra £500,000 it was called upon to pay in wages and salaries. He reminded the Council that the gas industry faced fierce competition from the oil and electricity industries. At the moment, whatever the future might have in store, the gas industry was almost walking a tight rope, he said.

Stand-by Supply

Alderman Hoy reminded members that in many cases people had gas installed simply as a stand-by supply. The cost of reading the meters and collecting was large and the return from a large capital outlay by the Board was small. The cost of such a stand-by supply was 'frightening.'

An amendment that the Council accept the minimum charge but not the maintenance charge did not receive a seconder.

PLENTY OF GAS APPLIANCES FITTED IN NEW FLATS

A HOUSING project of the Fulham Borough Council—Sulivan Court, built on the old No. 2 polo ground at Hurlingham—was completed recently when Mr. Herbert Morrison unveiled a plaque set in the wall of the last block to be completed.

In this £92,000 scheme there are 432 flats in 19 blocks, and building has been going on for more than five years. The blocks vary from three storeys to eight in height, including two three-storey blocks for old people.

Gas is well represented throughout the estate, and the North Thames Gas Board, in whose area it lies, has installed a gas clothes drying unit and a gas-ignited grate with back boiler in each flat. In addition, gas points have been installed for refrigerator, cooker, wash-copper, and portable fire, as well as a jigged fitting for a sink water heater.

Results so far show that on the estate there are 315 gas cookers installed, 63 water heaters, 72 back boiler units, 44 washing machines and coppers, and 11 refrigerators.

Mr. Morrison admires the sink water heater installed in the flat of Mrs. G. Shankland.

'Great Exception' Taken to Mayor's Remarks

THE Mayor of Newcastle-under-Lyme told a women's organization in his town that the day was coming when electricity and atomic energy would supersede gas. On March 26 an ex-Lord Mayor of neighbouring Stoke-on-Trent attacked him for saying so.

'I think we should take great exception to remarks like this coming from the chief citizen,' he said. The forecast was made earlier in March by Councillor N. F. Bradshaw in his town's branch of the Electrical Association for Women.

The retort was made by Alderman G. L. Barber at a meeting in Birmingham on March 26 of the West Midlands Gas Consultative Council. Alderman Barber said that the Mayor's remark had made some gas industry employees consider transferring to electricity to be sure of their jobs.

Mr. John Lewis, the Council's Chairman, said that the Mayor was 'ill-informed. Our records are continually being broken. There is no doubt that the gas industry will be maintained for a long time to come,' he added.

Company News

PARKINSON & COWAN—ALLIANCE & DUBLIN—DOUGLAS—LONDONDERRY—GLOVER & MAIN—CORK CONSUMERS'

Parkinson & Cowan

AT a meeting of the Board of Directors of Parkinson & Cowan, Ltd., held on March 28, it was decided to recommend to the stockholders at the annual general meeting to be held on May 9, a dividend of 5% on the ordinary stock of the company (less income tax) in respect of the year ended December 31, 1955, absorbing £21,544 net. (In the previous year, 9%, absorbing £38,780). The consolidated gross trading profit, less losses, for the year 1955 amounted to £218,877 (£383,167). There are no outside interests. The loss for the year is £35,456 (£123,821 profit) after crediting £51,716 in respect of surplus on sales and revaluation of investment, now liquidated, and surplus on sale of property and after providing for all charges including £160,552 for depreciations (£144,699) and £90,280 (nil) for exceptional obsolescence in a subsidiary company. The fixed assets replacement reserve of £50,000 has been credited to the profit and loss account to offset the depreciation and exceptional obsolescence of certain fixed assets during the year and this, together with a credit of £7,178 for adjustments relating to previous years, leaves a consolidated surplus of £21,722 (£123,919).

Alliance & Dublin

MOVING the adoption of the directors' report and statement of accounts at the ordinary annual general meeting of the Alliance and Dublin Consumers' Gas Company the Chairman, Professor Pierce F. Purcell, said on the capital account expenditure during the year was less by £9,105 than in 1954. Due, however, to non-provision this year of special depreciation of meters the net charge to the account was greater by £25,000.

On the credit side of the account the balance representing capital expenditure in excess of receipts reached £406,000, but in January of this year the figure was reduced by the issue and placing of £300,000 5½% redeemable debenture stock at par.

On the income side increases in charges for gas and coke were authorized, but were received too late to affect results for the year materially, and the amounts actually received were absorbed by lower income from tar sales and appliance rentals.

The year's trading had resulted in a surplus less by £7,852 than the previous year. Profit and loss account showed that the surplus from revenue account this became £86,119, and with the addition of net investment income and interest of £4,956 gave net receipts of £91,075 to meet capital charges. Debenture interest and the dividend of 7% required £92,285 and resulted in a reduction of £1,210 on the balance carried forward as compared with a year ago.

Control of the price of gas and the rate of dividend remained in the hands of the Minister for Industry and Commerce. During the year the Company again made application for authority to increase the dividend rate, pointing out the unfairness and the arbitrary nature of the Minister's policy in limiting their permitted distribution to below the pre-war rate.

The Chairman proposed that a final dividend for the year ended December 31, 1955, at the rate of £3 10s. actual (less income tax) on the consolidated ordinary stock of the Company be declared, same to be payable on and after March 31, 1956.

Douglas Gas Light

CHIEF reason for the fall of £848 in the profit made by the Douglas Gas Light Company, Isle of Man, last year was the greatly increased price of coal, which cost £6,000 more although 500 tons less were bought, said Mr. W. S. Waid, the Company's Chairman, at the annual meeting of shareholders on Monday, February 28. 'Moreover,' he added, 'it was coal which had not the same productivity as formerly. This is illustrated by the fact that we extracted much less benzole (and so had less for sale) in order to maintain the necessary calorific value of our gas. The increased cost causes a great deal of anxiety, but it is a matter over which we have no control. Coal is now costing 17s. 1d. per ton more than at this time last year, or at the rate of £17,000 more per annum.' Profit at £9,428 was £848 down. Adding the balance of £7,067 brought in there was available £16,495 subject to the September dividend of 7d. per share. A final dividend of 9.8d. per share was approved.

Londonderry Gas Light

MOVING the adoption of reports and statement of accounts at the annual meeting of the Londonderry Gas Light Company, the Chairman, Captain B. F. McCorkell, said the profit for the year after providing for transfers to the special purposes and renewals funds —which have the approval of the Ministry—together with provisions for taxation, amounted to £1,403.

Despite the exceptionally mild weather conditions experienced during the summer and autumn months of 1955 they had slightly exceeded the previous year's record output, having sold 359,696,000 cu.ft. of gas. It was gratifying to note that another daily record was established on December 21 when 1,568,000 cu.ft. of gas was sent out. Coke sold amounted to 6,454 tons compared with 5,905 tons the previous year, and the corresponding figures for tar sold were 252,000 gal. as against 251,560 gal.

While coal was now costing more than four times as much as pre-war and wages three times as much the price of gas had increased only just over 100% in the same period.

Congratulating the Managing Director and Secretary (Mr. George Walmsley) on the success of the Company's working, the Chairman said Mr. Walmsley had been with the Company since 1912. He became manager in 1924, and since nationalisation was now Managing Director of the largest gas company in Great Britain and Northern Ireland. It was due to his guidance that the Company had come so successfully through many difficult years.

Captain McCorkell was re-elected a director of the Company.

Glover & Main

GROUP profits of Glover & Main Ltd., for the year 1955, show a substantial reduction from the previous year's high level. The preliminary statement says that a final dividend of 11¼% is recommended—making 13¾% for the year—the equivalent of the previous year's dividend.

Group profits amount to £545,580, compared with £783,671, before tax, and to £262,879, against £371,341, after tax.

Cork Consumers'

THE directors' report with the accounts of the Cork Gas Consumers' Company points out that after providing £15,000 for depreciation, £3,200 for mortgage debenture redemption and paying an interim dividend of 3½%, less tax (absorbing £3,281), the balance of profits for the year ended December 31, 1955, amounted to £16,733. It was proposed to pay a final dividend of 3½%, less tax, which would leave a credit balance of £13,452 to be carried forward. Mr. T. Mahony, Chairman, said in his address that the year 1955 was remarkable for two factors directly affecting the gas industry. First, the exceptionally warm weather during the summer and autumn which resulted in lower demand for gas and, second, the increased costs of coal and of salaries and wages which accounted for the reduction in profits.

Mr. A. Allen, Chairman of the Midland Section, I.G.E., points out that in our report on April 4 of Dr. Idris Jones' address, we quoted Mr. Allen as saying, under the sub-title 'A Hint': 'Because as soon as you get to the total gasification of coal, especially if it is produced at high temperature . . .' In fact, Mr. Allen used the words 'at high pressure,' and we offer our apologies for this error.

PROPANE PLANT FOR GAS SUPPLY

DURING recent years the use of liquid propane as a source of gas supply has developed rapidly both in the United States of America and also in Canada, in which countries the economic factors determining its extended application are, of course, extremely favourable. Propane plant has been and is being installed in those countries not only by many gas undertakings for augmenting supply economically at times of peak load but by industrial organizations as standby plant and by new townships for providing total supply till such time as natural gas becomes available.

And while it is true that most of the propane plants have been installed for coping with peak loads and as standby to natural gas, it is highly interesting and to our mind significant that a considerable number have been installed to augment the production of 'manufactured' gas.

Mr. H. W. Townsend, President of Draketown International Corporation, 11, West 42nd Street, New York, 36, N.Y., has been good enough to send us some interesting information on this remarkable development and we are indebted to him also for the illustrations of typical propane plants which accompany these notes.

The Draketown has, of course, been installed in Britain in a small way and the packaged unit erected by the Wales Gas Board at Whitland, Carmarthenshire, has been described fully in the 'GAS JOURNAL.' Other plants are in successful operation in France and the Netherlands. What follows, however, relates specifically to the propane-air gas supply in the U.S.A. and in Canada.

A propane-air mixture having a calorific value of approximately 1,350 B.Th.U. per cu.ft. has in practice proved to be a satisfactory substitute for the average 1,050. B.Th.U. natural gas. The two

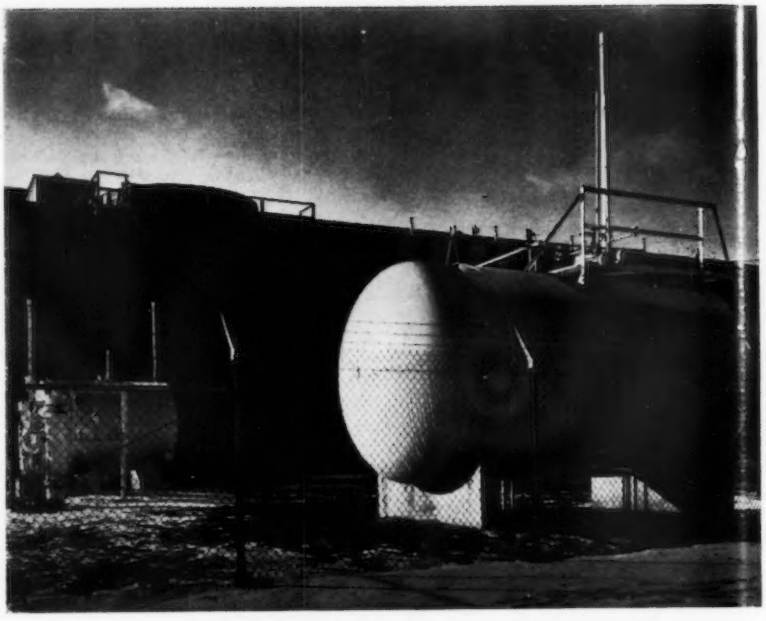


Fig. 1. Small industrial packaged propane plant installed at the factory of International Business Machine Corporation, Endicott, N.Y., U.S.A.

can be mixed in any proportions and where necessary the propane-air can entirely replace natural gas. Consequently very many gas undertakings in the U.S.A. use propane plant for helping with the peak load and also as standby in case of natural gas pipeline mishaps or because the natural gas interests, to serve their purpose, cut off the supply.

Indeed, it has come to be recognized by the medium and large industrial gas user in the U.S.A. and Canada that propane plants are a 'must' if they want to be assured of an non-interruptable supply of gas when they contract to use gas on anything like a reasonably economic tariff.

Flexibility is one of the chief attractions of these Draketown units, which can be designed for either low pressure or high pressure service and cover a very wide capacity range. Fig. 1, for example, shows a small industrial packaged standby plant installed at the factory of International Business Machine Corporation, Endicott, N.Y. In this instance

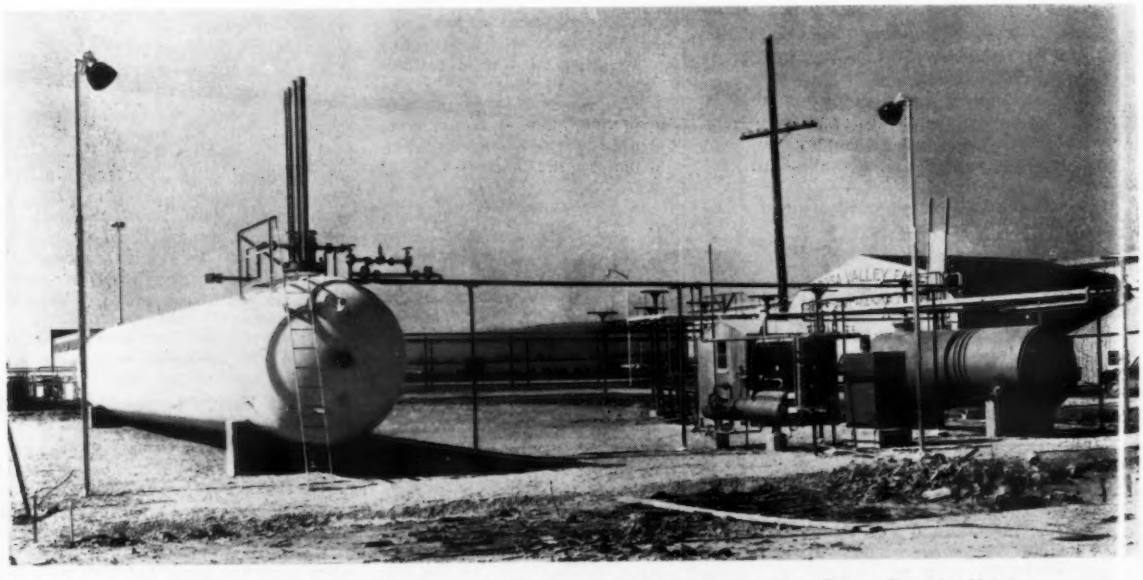


Fig. 2. Propane plant at the works of the General Electric Corporation, Rome, Georgia, U.S.A.

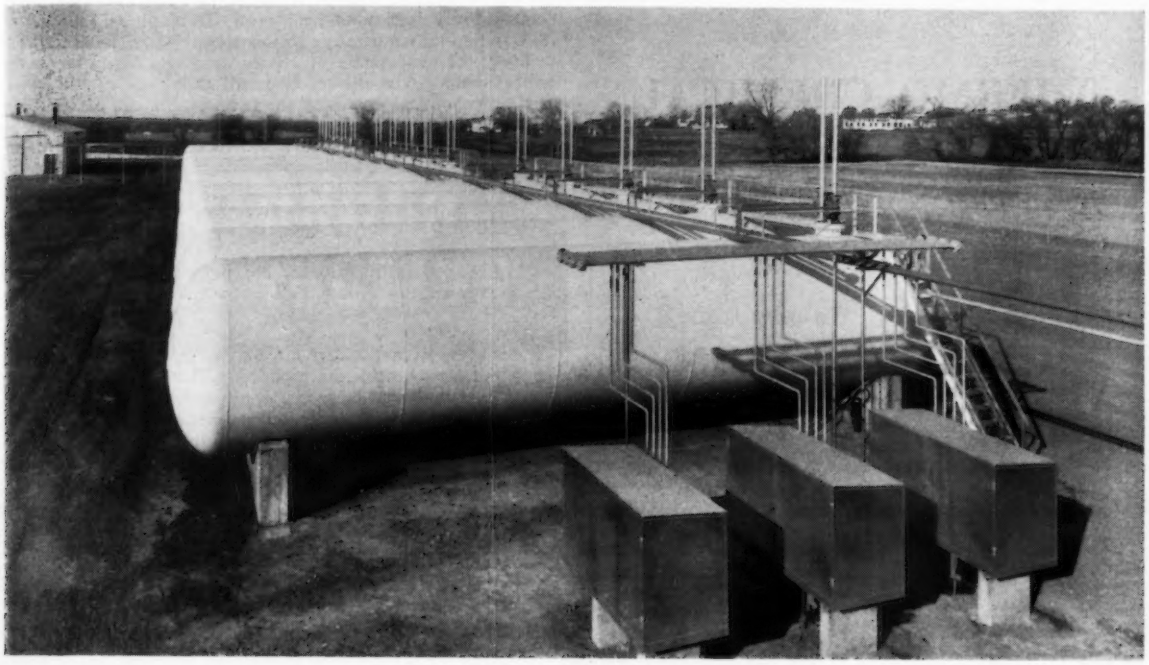


Fig. 3. A propane plant installation at the works of the Iowa Power and Light Co., capacity 500,000 cu.ft. per hour of 1,350-1,400 B.Th.U. propane-air gas at 120 lb. per sq. in. pressure.

steam from the works supply is provided to the vaporizer at a pressure of 10-15 lb. per sq. in. and propane is delivered by road tanker to the 7,200 gal. storage cylinder shown on the right of the photograph. The liquid propane is vaporized and passes to a Draketown dual jet LPG cabinet mixing unit which automatically produces a propane-air mixture which is a completely satisfactory substitute for natural gas and passes it to a surge tank maintained at a predetermined pressure. Demand for gas in the works causes a pressure drop in the surge tank and brings the small Draketown vaporizer unit into operation. Plants of this kind require little maintenance, are both accurate and reliable and are relatively inexpensive to install.

A somewhat similar plant has been installed by Sikorsky Aircraft (Division of United Aircraft), Strafford, Connecticut. This is a straight vapour plant, no mixing apparatus being required. Propane is delivered to the storage tank and is vaporized by an outdoor steam vaporizer, the vapour passing to the points of application where it is under close control. A larger industrial standby plant of the same type is pictured in Fig. 2, this packaged unit being installed at the works of the General Electric Corporation, Rome, Georgia, U.S.A.

One of the most recent propane plant installations at gas undertakings is that of the Iowa Power and Light Company, Des Moines, Iowa, U.S.A. (see Fig. 3). The plant there consists of 15 30,000-gal. propane tanks, road-tanker unloading station, two 125 h.p. low pressure steam boilers, four 250 h.p. air-cooled compressors, two 4,000-gal. Draketown automatic steam vaporizers and Askania control capable of a sendout of up to 500,000 cu.ft. per hour of propane-air gas (1,350-1,400 B.Th.U. per cu.ft.) at a pressure of 120 lb. per sq. in. This plant is employed largely for coping with peak load, and due to the large growth in the domestic heating load it is contemplated that a further plant on the same lines will be added very shortly.

A number of plants have been installed in Winnipeg, Manitoba, Canada, primarily for housing projects beyond the reach of gas mains. In these cases small packaged Draketown propane plants including storage tank, direct-fired cabinet vaporizer and dual jet Draketown cabinet mixing apparatus are installed, complete automatic town supply being provided by these plants. When natural gas becomes available it will be passed into the system, and no conversion problems will have to be met. When this happens the propane plants will be used for standby purposes and also for peak-load supply.

It is the experience both in the U.S.A. and in Canada that the advance of natural gas automatically extends the market for propane plants for the purposes outlined in the foregoing.

MECHANICAL TAR FIRING TO EFFECT SAVINGS?

BIG savings in gas undertakings are foreshadowed by a new development which has taken place in some of the smaller gasworks in Northern Ireland. This is the system of mechanical tar firing.

Previously tar has been used from time to time, but now the system is mechanized, and the result is that coke has been displaced in the furnaces and tar is injected by mechanical means under pressure.

In Strabane (Co. Tyrone) where the Urban Council Gas Manager is Mr. Joseph Lusted, President of the Irish Gas Managers' Association, it is expected that the saving will amount to between £400 and £500 per year.

'Satisfied With Results'

Mr. Lusted stated that after the system had been in continuous use for three days and nights without interference he was very satisfied with the results.

The system had come about as a result of intensive investigation by an eminent gas engineer in conjunction with some Northern Ireland gas managers.

It is now being used in Strabane, Omagh and Donaghadee, and the saving in costs will help to counteract increased wages and higher prices of coal and freight.

The system has not yet been tried in England, and as far as Mr. Lusted is aware it has not been tried in any other part of the world.

Indications are that it will prove highly successful and will spread throughout the entire country, particularly Southern Ireland, where it will prove of great benefit.

THERMO CHEMICAL ASPECTS OF CARBONIZATION

by

A. R. Myhill, *F.R.I.C., M.Inst.Gas E.*

IN the static, high temperature carbonization of coal, very many chemical reactions take place, both concurrently and successively; primary products react with one another to produce secondary and tertiary substances. In the course of the production of gas, tar, coke, and liquor, there are very wide variations in heat disposition and distribution, so that, during part of the time considerable quantities of heat are absorbed, and during other times large amounts are evolved. It is a remarkable fact, however, that these quantities approximately balance each other, so that the carbonizing process as a whole is almost thermally neutral. Experimental evidence on a large number of coals has shown that, while some types evolve a small amount of heat, others absorb a small quantity, but these amounts rarely exceed 50 B.Th.U. per lb. of coal, and are, on the average, considerably less.

In view of this, one may ask 'Why is it necessary to supply any heat at all to carbonize coal?'

Theoretically it would be possible to conceive of a process whereby the exothermic reactions in one stage could be made to furnish the heat necessary for carrying out the endothermic reactions in another stage. This is, in fact, what is attempted with varying degrees of efficiency in existing heat recovery processes, in which 'waste' heat is returned to the system to conserve primary supplies.

With the carbonization of a single static charge, this would be impracticable, partly on account of the non-concurrent nature of the stages. With a continuously operating retort, or even a collection of static retorts working at evenly spaced stages of the carbonizing cycle, the concept of utilizing the heat of the exothermic reactions to supply the requirements of the endothermic ones does not appear so impracticable.

When we begin to make a dissection of heat quantities in carbonization, we are at once confronted with certain essential differences between static and continuous systems. Carbonization in a continuous retort constitutes what might be termed a state of dynamic equilibrium, both as regards the formation of products and the distribution of heat. Thus, given constancy of operating conditions (including constancy of coal characteristics) we may, for instance, reasonably expect to find the rates of evolution of gas and tar vapours, the ratio of heat losses in different parts of the system, the temperature and composition of the atmosphere, both within the retort and in the combustion flues, to be constant over an indefinite period. Such is not the case, however, with static carbonization, where coal is not in a state of continuous motion through a heated zone, but is kept in substantially the same location throughout the whole of the carbonizing period, and various products are driven off over this period at fluctuating rates and in accordance with many chemical reactions, some of which are exothermic, and some endothermic.

A little consideration will give the answer to the question of why we have to supply heat even though the carbonizing process is thermally neutral. Although the exothermic reactions are self-propagatory, they will only take place if the system is above a definite temperature. This temperature is comparatively high, and heat must therefore be supplied to raise the initial temperature to this stage. If anything happens to lower the temperature at a later stage to a figure below the critical temperature, the reaction will cease, and cannot be restarted without again raising the temperature. A parallel case is the kindling of a wood or coal-fire. Here the combustion has to be started by means of a sharp local application of heat such as a match, which raises the temperature of part of the fuel bed to a stage when combustion is self-propagating after which the whole catches fire from the ignited parts. If conditions are such that temperatures are lowered to below the ignition point, the fire will go out. Such a state of affairs takes place when the flame of burning gas is extinguished by the cooling effect of conduction in the metal gauze of a Davy lamp or flame trap.

With endothermic reactions, considerable quantities of heat are absorbed from the carbonizing charge and become stored up as potential heat in the products. This withdrawal of heat would have the result of progressively lowering the temperature until the reactions both endo- and exothermic would stop unless external heat were supplied to keep the temperature up to reaction level.

In 'straight' carbonization, therefore, heat must first be supplied to raise the temperature of the retort and its contents to that necessary for the exothermic reactions to start. As soon as any endothermic reactions begin, heat is abstracted from the system, either from the exothermic reactions already proceeding or from outside sources. Since, however, considerable loss of heat will be occasioned on account of radiation, convection, and conduction of heat from the plant and in the outgoing products, it will be necessary to maintain a continual supply of heat from external sources.

Notwithstanding various methods of heat recovery, it will be impossible to conserve all the heat, and the greater the amount which can be conserved, and returned to the system, the greater will be the thermal efficiency of the process.

We have so far considered a case of straight carbonization. In vertical retort practice, however, whether intermittent or continuous, it is the almost universal procedure to steam the charge for the production of water gas within the retort. The gas-making process is, therefore, no longer thermally neutral, since this water gas is formed by exothermic reactions, and the heat necessary for this must originally come from the coke consumed in the producers. That portion of the heat which is absorbed in the water gas reactions is not, however, lost to the process, since it is added as potential heat in the products of carbonization, being released when the gas is burned, in the form of added therms.

Broad Principles

We may, therefore, enunciate certain broad principles: (1) No heat is required to maintain the chemical process of carbonization when considered as a whole. (2) Notwithstanding this, heat must be supplied from an external source (in practice, usually by the combustion of part of the products of carbonization), for the following purposes:

(a) Initial raising of the temperature of the system to that at which the reactions will proceed.
(b) Continuous maintenance of temperature by replacement of heat losses from the structural features of the plant, and from outgoing products evolved at high temperatures.
(c) Provision of heat for maintaining the endothermic reactions of water-gas production in those cases where steaming of the charge is practised.

In gasworks practice, the necessary heat is, of course, normally supplied by the combustion of producer gas made from part of the coke, and, with the exception of the heat concerned in (c) above, all of it will be 'lost.' It may, in fact be dissected into two streams: (1) Heat conducted through the retort walls into the charge, and (2) Heat passing away from the flues to the chimney in the combustion products, and also that radiated, conducted, and convected to the outside atmosphere in the course of the disposal of these products. Since none of the heat involved in (1) is used in the carbonizing reactions, this part is wholly accounted for as sensible and latent heats of the products passing away from the retort, plus, in the case of 'steamed' carbonization, the added potential heat units in the gas due to absorption of heat of formation of

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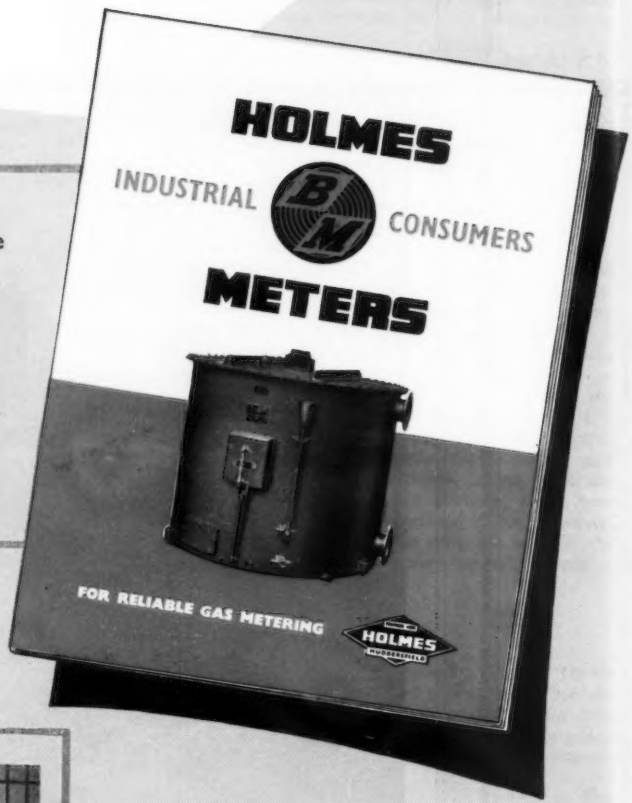

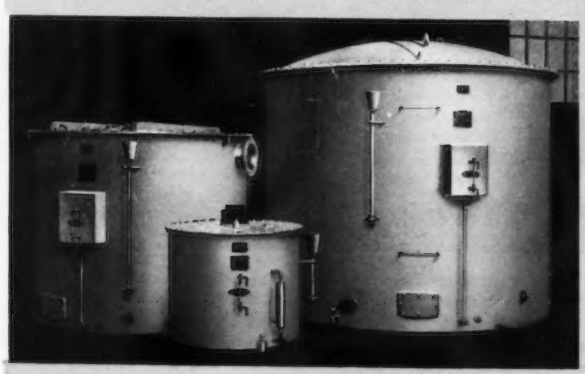

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water-gas. (Incidentally, it may not be out of place to stress the point that this increase does not represent the heat of combustion of the water-gas, but only its heat of formation, i.e. the difference between the potential heat of the water gas and that of the carbon from which it was formed. As an example, taken from continuous vertical practice, the heat of formation of the water gas produced was equivalent to two therms per ton of coal carbonized, but the heat of combustion of this gas was about nine therms per ton of coal.)

The heat in part (2) comprises the sensible and latent heats of the gases passing away from the chimney and of any solid hot material such as ash, clinker, and fuel removed from the producer during the fire-cleaning operations, plus radiation losses, etc., from the structure.

It has been stated above, that the heat losses can be considerably minimized by methods of heat recovery such as recuperation, lagging, and return of part of the 'waste' heat to the system. Steam production by the passage of hot flue products through waste-heat boilers is also a means of converting otherwise unsaleable lost heat to a useful purpose. Excessive production of steam from this source, however, is likely to prove financially inefficient except in special cases where a favourable market exists for exported steam or electrical power is made on the works.

Shortly after World War II, the conception of the so-called Fuel Expenditure Index (1) as a method of assessing the efficiency of gasworks operation was introduced by the Ministry of Fuel and Power. This, as applied to carbonization, was a figure, expressed as a percentage, representing the loss of saleable therms relative to the therms of potential heat in the coal used. The saleable therms consist of gas, coke (after deduction of coke used in producers, or for essential steam raising), tar, and benzole, if recovered. The F.E.I. varies inversely as the thermal efficiency of the process. In view of the confusion of thought which sometimes arises, a word of explanation may not come amiss. The Fuel Expenditure Index is not, as is sometimes supposed, the heat value of the coke used for heating the retorts. It takes into account, for instance, actual losses of gas through leakage and loss of coke by combustion when discharged in the hot state. It also includes losses due to removal of H_2S in purification, and other small items, so that its value is always higher than the percentage of producer-coke therms relative to coal-therms.

The table below gives typical figures which might reasonably be expected when carbonizing a South Yorkshire coal in horizontal and continuous vertical retorts. In the latter case, the charge was steamed to produce added water gas, and waste heat recovery was practised to the extent of providing steam in excess of that required for the gas-making process.

It will be seen that the thermal efficiency is much higher for steamed continuous verticals, with the production of surplus steam, than for horizontal 'straight' carbonization without steam production. The total quantity of coke to producers per ton of coal carbonized, is much higher for horizontals, notwithstanding the fact that no steam is made for sale or use. The total heat lost per ton of coal from the process is nearly twice that lost from the vertical installation, taking into account the value of surplus steam in the latter case.

The preponderating factors contributing to these differences are, the recovery of waste-heat from the flue gases in the case of the continuous verticals, and the loss of sensible heat in hot coke discharged from the horizontals.

A great saving in heat is achieved in continuous vertical retorts by utilizing the sensible heat of the descending column of coke for pre-heating the incoming steam to the temperature required for copious generation of water-gas. The up-rising gas, together with uncracked steam, returns considerable quantities of heat to the upper parts of the charge. In horizontal retort practice, the residual heat of the coke is lost by external quenching.

It has been calculated, and confirmed in practice, that this residual heat in the coke is sufficient to produce 2,500-3,000 cu.ft. of water gas per ton of coal without adding to the producer fuel. The 'carrier gas' effect of steaming has been strikingly demonstrated in the course of the development of the Glover-West retort, where, by the addition of the unheated 'steaming chamber' at the base of the carbonizing chamber, an increase in retort output of about 40% was obtained. In modern designs, both of the W.D. and of the G.W. systems, the steaming chamber is represented by the bottom 4 feet or so of the retort which is generally surrounded by secondary-air circulating flues. The throughput is maintained and with the improved form of setting heating, 'lambent heating' in the one system and 'balanced heating' in the other, producer fuel has been cut to around 10% when making gas in the region of 500 B.Th.U. per cu.ft.

DISPOSITION OF HEAT OF COMBUSTION OF COKE TO PRODUCERS IN TWO SYSTEMS OF CARBONIZATION

	Horizontals		Continuous Verticals	
Therms in coke to producers per ton coal carbonized	42.1		36.7	
Pounds coke per 100 lb. coal carbonized	15.6		13.6	
	Therms per ton coal carbonized	% Therms of coke	Therms per ton coal carbonized	% Therms of coke
(A) Heat Conducted through Retort Walls into the Charge				
(1) Lost as sensible and latent heat of crude gas and vapours passing out of retort, and by radiation, convection and conduction from gas offtakes, mains condensers, *etc.*	6.2	14.8	6.2	17.0(*a*)
(2) Lost as sensible heat of coke removed from retort and not sent to producers	11.3	26.5	2.1	5.7(*b*)
(3) Heat of formation of water gas in retort, added to potential heat of gas	*Nil*	*Nil*	2.0	5.5(*c*)
Total heat conducted through the retort walls into the charge	17.5	41.3	10.3	28.2
(B) Heat Lost in Producer and Heating System and Heat Passing Away from the Combustion Flues				
(4) Lost as sensible and latent heat in flue gases passing away from chimney	12.1	28.8	5.2	14.2(*d*)
(5) Lost as sensible and potential heat in ashes, clinker and unburnt fuel removed from producer grate during cleaning *etc.*, plus heat losses by radiation *etc.*, from producer	5.3	12.6	4.0	10.9(*e*)
(6) Lost from setting brickwork by radiation *etc.*	7.2	17.3	5.5	15.0(*f*)
(7) Recovered as surplus steam in waste-heat boiler from sensible heat of flue gases, after allowing for steam to retorts, producers, *etc.*	*Nil*	*Nil*	11.7	31.7(*g*)
Total heat lost and recovered outside the retorts	24.6	58.7	26.4	71.8
Total heat lost = $a+b+d+e+f$	42.1	100.0	23.0	62.8
Total heat recovered and used = $e+g$	*Nil*	*Nil*	13.7	37.2
Total heat of coke to producers	42.1	100.0	36.7	100.0

GAS MAINS UNDER THE USK*

BY

M. F. SCOTT, A.M.I.G.E.,
Deputy Distribution Engineer, Wales Gas Board.

THE town of Newport lies on each side of the River Usk, the river being spanned at three points by a railway bridge, a road bridge situated in the centre of the town and, one-and-a-half miles down stream, by a transporter bridge of unique design on which the traffic is transported from one side of the river to the other by means of a travelling platform.

The position of the river in the general layout of the town has made the distribution of gas a problem; all gas supplies to the east side of the town have to be carried over the road bridge in the centre of the town, thus resulting in relatively long feeder mains to the various residential and industrial districts on the east side of the river. The undertaking is in receipt of bulk supplies from three different sources, the gases being readily interchangeable. The area of supply is fed from three holder stations situated on the west side of the river:—

(a) Crindau—situated in the north-west of the town.
(b) Mill Road—situated in the centre of the town.
(c) Mendalgief—situated in the south-west of the town.

The maximum daily output of the undertaking is approximately 9 mill. cu.ft. The first two mentioned stations are supplied with unpurified gas from the British Benzole and Coal Distillation Co., Ltd., at Bedwas, and the latter with purified gas from the South Wales Gas Grid or from the Guest, Keen and Baldwins coke ovens, Cardiff. The distribution system consists of relatively large diameter low pressure mains; pressure control is carried out at the holder stations.

The County Borough development plan showed that a 'neighbourhood unit' of some 3,000 houses was to be commenced in 1956, on the east side of the river. The development of the 'neighbourhood unit' was programmed to take some eight to ten years, and discussions with the undertaking management were held in February, 1955, as to the methods that could be adopted to make additional gas supplies available to the east side of the river to meet increasing domestic, commercial and industrial demands.

The availability of supplies was examined. This indicated that while the immediate requirements could be met from the South Wales Gas Grid for most of the year, it would be necessary to make increased use of peak load plant during maximum demand periods. It also showed that the eventual estimated increased demand of 4 mill. cu.ft. could be met by the greater availability of gas from eixsting and future sources of supply. (Mr. Scott then described how the decision to lay a submarine main under the River Usk was arrived at.)

Planning

A crossing point one hundred yards upstream of the transporter bridge was agreed upon by all parties with the proviso by the Newport Dock and Harbour Board that the cover on the main should not anywhere be less than 6 ft. Examination of the project was divided into five sections:—

(a) Calculation of the main diameters and the initial pressures required at the Mendalgief holder station.
(b) The dredging of a suitable trench in the river bed.
(c) The design, fabrication, testing and protection of the submarine mains.
(d) The launching of the submarine mains from the erection base.
(e) The placing of the mains in the trench in the river bed.

Calculation of main diameter and initial pressure.

The ultimate peak flow required was estimated to be 310,000 cu.ft. per hour. While it was not expected to reach this figure for some years it was prudent to anticipate that 70% of this estimated peak load would have to be met within five to seven years. The length of main required from Mendalgief on the west side of the river to the furthermost district to be supplied on the east bank, was 8,650 yds. The main diameters decided upon were 18 in. for a distance of 6,300 yds., and for the remainder of the distance 15 in. The initial pressure was calculated to be 2 lb. per sq. in.

Dredging of the river bed.

The rise and fall of tide in the River Usk at Newport is the second largest in the world, the maximum difference between low water and high water being approximately 35 ft. This in itself created a problem; the use of a dredger for the excavation of the trench would mean that the dredger could only operate at certain tide levels; the contour of the river bed also would restrict the use, and a considerable amount of the trench would have to be dug by drag lines from the banks of the river. A survey showed that the maximum depth to the top of the main would be 52 ft. in relation to the level of the roadway on the west bank of the river.

Earth samples showed that most of the material to be excavated was clay of various types, but that a strata of compact gravel would be met when dredging at the deepest point. The presence of the gravel was in one sense welcomed as it would give a natural foundation to the pipeline at the lowest point; but whether the dredger would be able to remove the gravel without first having to loosen it by blasting was problematical.

Design of the submarine mains.

The survey of the river bed revealed that the deepest point was about 200 ft. from the west bank of the river, the contour being reasonably straight at all points, with an angle of 167° where the west bank meets the east bank.

The gathering and disposal of condensate had to be considered, as the gas passing through the main might be partly or fully saturated. Syphons were designed to collect the condensate from a flow of gas of 4 mill. cu.ft. per day with a 10°F. drop in temperature, the syphons to be emptied once weekly. An allowance of 50% was made in case of a higher temperature drop or increased volumes at a later date. The depth of the syphon meant that to remove the condensate it would be necessary to pressurize the main to 26 lb. per sq. in. gauge and in order to provide security of supply it was essential to recommend the laying of twin mains. The weight of the steel mains in water would enable them to float and it was planned to coat the mains with Gunite to give them an adequate negative buoyancy. A coating 1.5 in. thick with steel wire mesh bonding was recommended for the 18½ in. outside diameter main, with a coating of 2½ in. on the 36½ in. outside diameter by 24 ft. syphons. It was estimated that the weight of each of the 'Gunited' pipes in air would be 75 tons, displacing 59 tons of water, giving a negative buoyancy of 16 tons.

Fabrication, testing, and protection of the submarine mains.

On the east bank of the downstream side of the transporter bridge there is a piece of land known as the Saltings, which appeared a suitable site for the fabrication of the pipe lines. The site is level, is as near to the point of sinking as one could hope, and high water tides at certain periods of the year flood the land.

An all-welded pipe line was recommended, all welds to be tested on site with ultrasonic weld test equipment with samples of welding, subject to a tensile test. The 18½ in. steel pipe recommended has a pipe wall thickness of 0.5 in. to A.P.I. Standard, sheathed with bitumen, wrapped with three layers of fibreglass and two layers of thermoglass, impregnated with bitumen and lime washed. The 36½ in. steel pipe has a wall

* Joint Meeting of the Wales and Mon. Junior Gas Association and the South Western Junior Gas Association, March 24.

thickness of $\frac{5}{8}$ in. A.P.I. Standard with a similar sheathing to that in the 18½ in. diameter pipe.

It was proposed to have the 18½ in. and 36½ in. mains coated internally with red lead; after welding, each joint was to be wire brushed and recoated internally. It was also planned to install a magnesium anode in the syphon to give protection to any exposed metal. The steel pipe specified had to be subject to a hydraulic test of 500 lb. per sq. in. gauge at the manufacturer's works, and it was planned that on completion of the fabrication of the mains, they would be subject to an air test pressure of 100 lb. per sq. in. for a period of 48 hours. All joints were to be tested with soap and water, the pressure test instrument to be the South Eastern Gas Board's main pressure tester, the maximum allowable pressure drop to be 0·03 lb. per sq. in. and all readings to be taken three hours after sunset, to minimize the effect of temperature. On the satisfactory completion of the tests all welded joints were to be sheathed with bitumen and fibreglass, with an outer wrap of thermoglass, the whole of the pipe lines to be then tested with a holiday detector for flaws in the sheathing, before the application of the Gunite.

Launching of the Pipe Lines

As previously stated, certain tides flood the Saltings. It was planned to use these maximum tides to move the pipes from the erection base to a lower level on the river bed, to ensure more time being available for moving the pipes into position over the trench on the days selected for their sinking.

The agreed method of launching the pipes was similar to that of launching a ship sideways. It was planned to lay, at regular spacings, wooden beams at right angles to the pipes and extending from the pipes into the river, the beams to be made secure to the ground to prevent them from floating. As steel hawsers were to be fastened around the pipes, special steel protection plates would be fitted at predetermined points to which the pontoons could be attached at high water level. Further hawsers were to be attached to powered craft in the river; the craft would pull the pipe into the river, along the wooden beams, until such time as the pontoons were able to support the pipe free of the river bed. The craft would then continue to draw the pipe and the pontoons into mid-stream where the pipe could be lowered by the pontoons on to the river bed at a selected level.

The currents in the river were of the order of five knots and it was apparent that the placing of the mains over the trench, and sinking them into the trench would have to take place during the period of slack water immediately following the high water. This period lasts approximately one hour; it was planned to raise the pipes from the river bed by pontoons as soon as the tides permitted, move them to the position of the trench by powered craft, and hold them in that position in line with the current until slack water. The powered craft would then tow the pipe and pontoons into position over the trench, and would hold them there until the pipe was lowered into the trench by winches on the pontoons. Agreement was reached with the Dock and Harbour Master to suspend all river traffic on the days concerned for a period of one hour each day.

Modification to original scheme

The main modifications suggested and agreed to were concerned with the launching and movement of the pipes. The contractors felt that it would be better to raise the pipe lines by pontoons from ground level on the Saltings, during high water; with the pontoons anchored from midstream they could by operation of the anchor winches draw the pontoons and the pipe line free of the Saltings to a point in mid-stream where the pipe could be lowered on to the river bed.

Arrangements had previously been made for the supply of the steel pipe and it had been agreed that the first consignment would be on site on August 1, 1955. Unfortunately, the railway strike of April/May had affected the production of the pipe and the manufacturers could do no more than promise the first delivery by August 12, 1955, a promise that was kept. This, however, did affect our programme as it left insufficient time for the prefabrication and testing of the pipe lines which it had been planned would be launched on August 20 and 21. It was agreed to launch the pipes on September 18 and 19, 1955, and to sink the pipes on September 21 and 22.

Testing a weld with the ultrasonic field unit.

The tides to be used were not so favourable as the August tides; they were adequate for the launching of the pipe, but meant that the total length of pipe which could be floated into position would be reduced by some 25 ft.

With the pipes partly constructed, precautions had to be taken to prevent waste material entering them during the high tides on September 4, 5 and 6, and grid plates were welded to the ends of the mains. These plates allowed water to enter the pipes to prevent them from floating, but excluded the entry of solids. On August 19 sighting poles were erected on each bank indicating the line of trench, together with 'dead men' for the anchoring of the dredger.

Dredging of the trench commenced on August 23 and proceeded satisfactorily until the hard base of gravel was reached. As maximum depth was approached trouble was experienced with the buckets on the dredger, three of which broke away at the pinions. This necessitated the dredger going into dry dock for three days for repairs.

A trench in the centre portion of the river, 20 ft. wide at the top, 12 ft. wide at the bottom, and 8 ft. 6 in. deep, going down to 12 ft. at the position where the syphons were to be laid, was completed by the dredger by September 9. The dredging of the banks had, however, to be commenced and lines were laid from winches on the dredger, positioned in the centre of the river, to the gib of the draglines which were positioned on each bank, so that the drag line buckets could operate over a greater distance. The dredging of the banks in this manner necessitated the draglines being close to the edge of the river, and it was necessary to lay 40 tons of crushed brick as a foundation for the dragline on the east bank of the river.

The prefabrication of the pipe lines was completed on August 25. The pipes were put on test with air pressure at a 100 lb. per sq. in. gauge for a period of 48 hours and all

The underwater mains Gunited and ready for launching. The syphons are shown in the foreground.

joints were tested with soap and water. A pressure loss of 0.04 lb. per sq. in. was calculated after correcting for barometric and temperature changes. Due to the difficulty of measuring the exact temperature of air in the main this was accepted as satisfactory.

Launching and Sinking of Pipe Lines

Depth soundings were made in the trench to satisfy ourselves that the cover on the pipe would be adequate once the pipes were in position. All soundings showed an excess of depth of between 1 ft. and 1 ft. 6 in., but this excess was preferable, as there were several days to go before the sinking and each tide deposited silt into the trench.

A check was made on the width of the river. The question of width was critical as it was essential to float into position pipe lines as great in length as possible, due to the difficulty of extending the pipes from the river bed to the banks. The length of the pipelines had been ascertained by marking on the river bed the position of the tide level we could expect on the day of sinking and by deducting from the total width of the river as given by our consultants in their survey, the distance from these markers in the river bed to the consultants' original point of measurement on the river bank. The method of checking was carried out by extending a chain from the consultants' original points of measurements on each bank; an error of 20 ft. was noted. It was immediately necessary to shorten the pipelines by the difference in these measurements, otherwise the pipelines would have been longer than the width of the river at that particular tide and it would not have been possible to pull the longer pipes into position over the trench. Each pipe now measured 725 ft., and was retested at 100 lb. per sq. in and found satisfactory. The first pipe was scheduled for launching on September 18, when the tide was expected to reach 46 ft. 2 in. at 8.4 a.m.

The pontoons were placed in position on the previous high tide, and at high water on September 18 all but two were afloat supporting the pipeline. The two which did not float were those attached to the syphon: It was found impossible to raise the syphon from its position, and the attempt to float the main on this tide was abandoned. The cause of the failure was the fact that the tide was 1 ft. 6 in. lower than expected, probably due to the very fine weather and to the absence of wind.

The tide of the following morning was expected to be 45 ft. 3 in. at 8.37 a.m. and it was decided to move No. 1 pipeline downbank into the river sufficiently for a 42 ft. tide to raise it. This operation was carried out by two cranes and it was not completed until the early hours of the following morning. To ensure success on this tide the hopper was brought into operation to pull the section of the line containing the syphon into the river, should the syphon tend to ground. The pipeline was successfully floated at high water, it being necessary to use the hopper to free the syphon. The pontoons then moved into mid-stream by the use of the anchor winches and at 9.30 a.m. the pipe was lowered on to the river bed at the 25 ft. tide level.

The 'Dead Man'

The tide on September 20 was expected to be 44 ft. 0 in. at 9.6 a.m. and it was necessary to move pipe number two to the 40-ft. tide level. The whole operation was successful, again using the hopper, and the pipe was lowered to the 21-ft. tide level by 10.0 a.m.

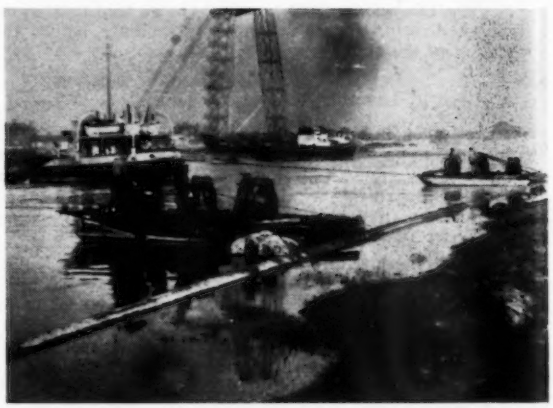
The final preparations were made to raise the first pipe on the morning tide of September 21. Three single and two double pontoons were to be used, pontoons one to four being attached with wires controlled by winches on the pontoons to a guide wire running along the bank of the river to a 'dead man' situated at the end of the trench on the east bank of the river. This 'dead man' took the form of a winch, the use of which is explained later. The hopper was positioned at a jetty on the opposite side of the river to the Saltings and pontoons two and four were connected by wires from the forward winches of the hopper. This meant that complete control of the position of the pipe in the river and of its speed of movement up the river, was possible.

Pipe number one was afloat at 6 a.m. on September 21 and its controlled movement upstream began. High water mark was expected at 9.34 a.m. and it was hoped to have the pipe at right angles to, and over, the trench, 30 minutes before slack water.

Loud speakers had been set up on the transporter bridge to ensure that all orders could be heard distinctly by the men on the pontoons and on the hopper, as a mistaken direction could have serious consequences. Difficulty was experienced in floating the end of the pipe past the eastern supports of the bridge, and the pipe was not in position until five minutes before schedule.

The tide level was as anticipated; the hopper winches and the 'dead man' winch on the eastern end of the trench came into action, the former to pull the pipe at right angles to the river and the latter correctly to position the pipe at the eastern end of the trench.

When the pipe reached the correct position at the western end of the trench a line was attached to a dragline situated directly opposite the 'dead man' winch on the eastern bank.



Launching the second pipeline. The hopper is shown in the background.

With the pipe line ends in position the pontoon winches, which had been in a locked position, were freed to operate on the hand controlled brakes. At a given command all winches were released slowly, the operators having been drilled to keep the supporting wires taut to ensure they were carrying weight. The pipe was grounded within minutes, all pontoons were freed, and the river was clear for traffic by 9.55 a.m. The launching of the second pipe on the following morning tide followed the same pattern and again the river was clear for traffic at 10.15 a.m. Both mains were given a 12-hour test at 50 lb. per sq. in. gauge and were found satisfactory. Each pipe line was subjected to examination by a diver and its position in relation to the other was plotted with the use of echo sounding equipment. A satisfactory report was received, except that the Gunite had been damaged in several places. This was not a matter of concern as the main purpose of the Gunite was to give an adequate negative buoyancy.

Soundings indicated that the syphons were out of level by some three or four in., but it was planned to rectify this after the main had been extended to the western bank and lowered to the required depth. By September 29 the mains had been extended out of the eastern bank, lowered to give a cover of 6 ft. and tested to 50 lb. per sq. in. for a period of 12 hours. The test was satisfactory, the welded joints were cleaned and were given a primary wrapping of P.V.C. based adhesive tape, followed by two layers of reinforced P.V.C. tape. It was not possible to wrap these joints with bitumen and fibre glass due to the extremely bad working conditions.

The extending of the pipe lines out of the west bank proved a little more difficult than out of the east bank, it being necessary to fit sheet piling at one point in the trench as the action of the tides seriously weakened the trench wall. The work was, however, completed by October 10, the whole operation being carried out under very bad working conditions. Both pipelines were again tested and found satisfactory.

Land Mains and Cathodic Protection

Work commenced on the land mains immediately after the completion of the submarine mains, 950 yards of 18 in. diameter main was laid from the east bank to the industrial area.

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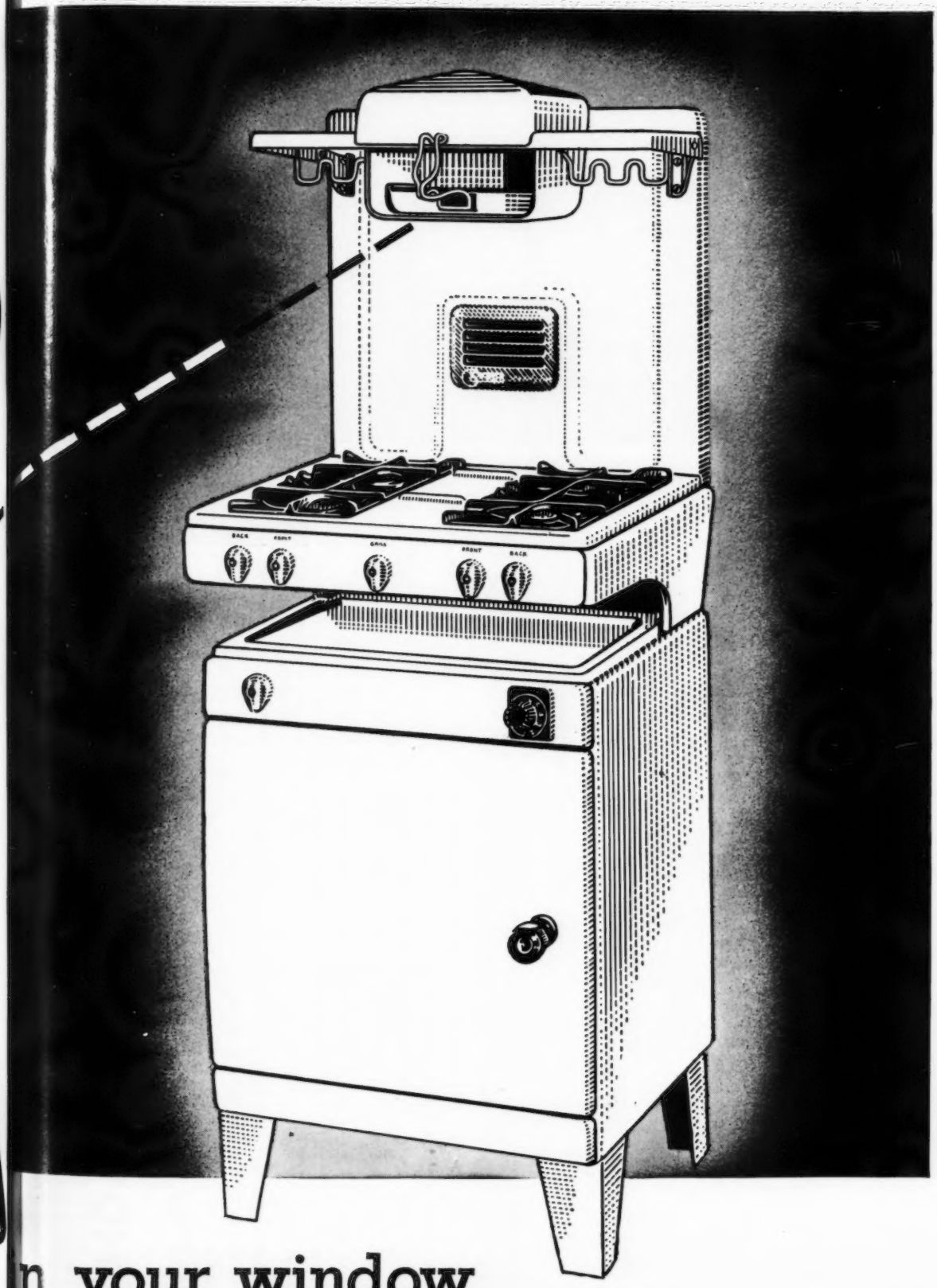

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and a temporary supply was made available from the 15 in. diameter low pressure main which feeds the area on the west bank of the river. It is expected to complete the land mains as planned by April, 1956.

Current drainage tests have been carried out on the submarine mains using a ground bed of steel pipes. From the results obtained a cathodic protection system is being designed, using magnesium anodes, which will give full protection to the main between the valve arrangements on each bank. Insulation flanges are fitted in the valve arrangements to limit the field of protection, so that the more economic system of using magnesium anodes can be adopted.

DISCUSSION

Mr. R. Pratt, Weston, drew attention to the danger of the syphon pipe ends being grounded in the bottom of the syphon and enquired what precautions were taken to prevent the ends becoming blocked. He also asked if any special filling was used for the bed of the trench.

Mr. Scott replied that the ends were kept 4 in. from the bottom of the syphon by means of clips, and the higher pressure necessary for the syphon emptying, *i.e.*—26 lb. per sq. in. gauge, would ensure that the tubes remain clear. No special filling was used for the bed of the trench. The syphons were lying on a bed of gravel and the pipes in boulder clay and there was no danger of sinking.

Mr. McAfee, Bath, asked, if it was necessary to use a pressure of 26 lb. per sq. in. gauge to empty the syphons?

Mr. Scott replied that the maximum theoretical lift under atmospheric pressure is 32.2 ft., while the actual lift in practice is about 27 ft. The main would be worked at a pressure of only 2-3 lb. per sq. in. gauge which would only add a few more feet to the lift. It was decided that the individual mains would have to be pressurized separately, and by this means the condensate be forced out. This was the only method that could be adopted.

Mr. Manning, Bristol, enquired if any sinkage of the main was expected, and if so what precautions had been taken.

Mr. Scott answered that no sinkage was expected. Soundings were taken after the mains were laid and there was found to be no movement.

Mr. Hawkins, Coventry, commented on the question of corrosion and asked, what was the effect of seawater on the Gunite coating and was a maintenance schedule planned?

Mr. Scott said that precautions against internal corrosion were that the whole of the internal surface of the pipe and the syphons were coated with red lead. As an extra precaution the syphons were protected with a magnesium anode. These would give protection to any exposed metal in contact with the condensate. The purpose of the Gunite was to give protection to the wrapping during the laying operations and to give the pipe a suitable negative buoyancy to enable it to sink.

Internal Corrosion

The pipe was sheathed with bitumen impregnated fibreglass with an outerwrap of thermoglass as a protection against external corrosion. Current drainage tests had been carried out in the pipe lines and a magnesium anode cathodic protection system had been designed to afford full protection to the main. Current drainage tests would be carried out every six months to ensure that the cathodic protection system was adequate. If deterioration of the wrapping occurred it might be necessary to replace the magnesium anode system with an impressed current system to give greater protection if necessary. It was not expected that these conditions would arise.

Mr. D. J. Maunder, President, South Western Junior Association, enquired whether any problems were likely to arise when the syphon pipes needed to be changed. On the pressure testing of the mains before laying, were any safety precautions taken? He appreciated that on a project of this magnitude faults in the wrapping would inevitably occur. How many and how were they repaired? After the mains were laid were the syphons checked for levels, and if they were found to be out how was this rectified?

Mr. Scott said the syphon pipes were of stainless steel and should give a very long life, but in the event of a change being needed the old pipes would be left in and the new pipes would be threaded down the 18 in. diameter pipes. To assist the motion forward it was planned to use small wheels on the ends of the pipes. The mains were tested up to 50 lb. per sq. in. gauge and left for four hours, and then the test pressure was increased to 100 lb. per sq. in. gauge and left for 48 hours. The joints were also tested with soap and water, only one man being allowed on the main. It was found that there were 50 holidays in the wrapping, and these were repaired by using bitumen and hot flat irons. The actual cost of the work was not to be divulged, but the scheme saved £90,000 by adopting this method of laying instead of going around through the town. Divers inspected the syphons, and the correct levels were obtained by washing under the pipes at low tide levels with high pressure hoses.

Elmley Ferry

Mr. S. L. Wright, Wales Gas Board, compared this project with a similar one that he had completed some years ago at Elmley Ferry. The size involved was 8 in. and twin mains were laid across the River Swale. Each main was tested to 100 lb. per sq. in. gauge and was sleeved inside a 12 in. steel main, the annular space between being filled with cement. This did not give negative buoyancy, and to achieve the required result the main was filled with water. The trench was excavated by grab, the width being suitable for this method. He stressed the importance of correct length of fabricated main—in this instance the section was too long and it was extremely difficult to make it fit. After the laying was completed, bags of cement were laid over the mains and placed in position by a diver. The ends of the mains terminated in angle tees and syphon pipes threaded through the ends of the tees, and in this instance ordinary pumping pressures sufficed for clearing the syphons. A great deal of trouble was caused by holidays in the wrapping, and in one instance it was found that a pebble had pierced the main. This had to be repaired before it could be used. Another fault was that the mains should have been valved separately.

Mr. Scott stated that there was a limit to the thickness of Gunite to give negative buoyancy. If this limit is exceeded the buoyancy becomes more positive instead of negative, and in this instance the thickness of Gunite was calculated to be 2.4 in. The actual thickness used was 1.5 in.

Mr. A. H. Dyer, Newport, stated that the original mains system was designed to meet a maximum of 500 mill. cu.ft. per annum, whereas the present output was over 2,000 mill. cu.ft. per annum. He pointed out that Newport has an extremely severe traffic problem, and the alternative route would have involved about four miles of town mainlaying, this work being carried out only at night time. Close contact was maintained wilth the harbour authorities, and the Harbour Master was worried because the normal amount of fresh water in the river plus the spring tides carried away a tremendous amount of silt at that time of year. However, the weather had been extremely dry, and examination of the main showed that it was silting up very well.

'A First-class Achievement'

Mr. E. M. Edwards, Wales Gas Board, congratulated everyone concerned with this project on a first-class achievement, and stressed that success in operations of this sort depended upon the thoroughness of the initial investigation. No details, however small, should be overlooked, for example amount of silt in the water and speed of flow. Speaking personally, he had always avoided 'going under' if at all possible, but in this instance the only practical solution was a submarine crossing. To tackle work such as this required confidence and courage.

Mr. Tweedle, South Western Gas Board, commented on the defects found in the Gunite coating by the divers. What method was used for checking the soundness of the bitumen coating?

Mr. Scott said the divers found no damage had been sustained by the bitumen coating, and the readings obtained showed that little or no bare metal was exposed. The current drainage tests necessary for the design of the cathodic protection system gave an indication of the amount of exposed metal.

Mr. Luxton, Torquay, asked what type of valves were used. Was the bitumen sheathing expected to reduce the condensate

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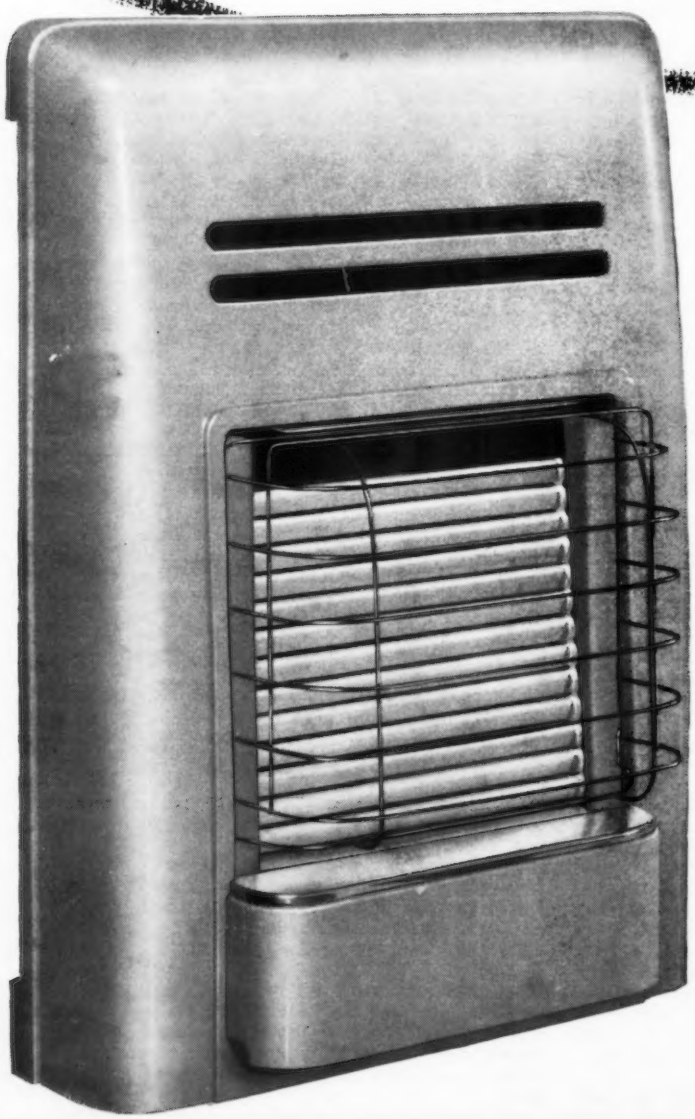

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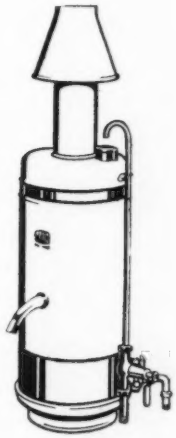

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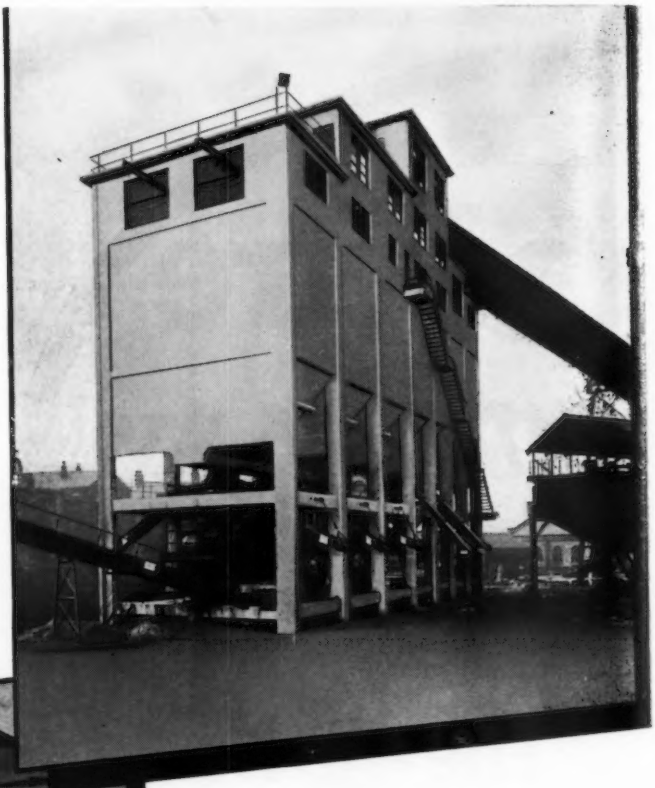

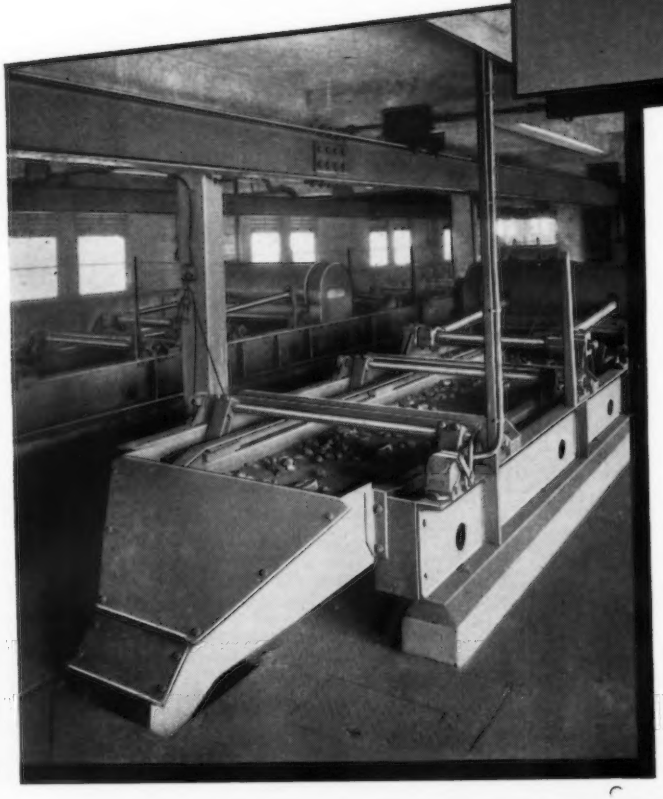

AN 80 TONS PER HOUR COKE HANDLING PLANT

installed at the Bradford Road Works, Manchester, of the North Western Gas Board.

This modern plant incorporates feeder and belt conveyors from the retort house. Scalping screens, coke cutters and grading screens are located in parallel over 850 tons capacity storage bunkers. Below the bunkers debreezing screens are fitted with electrode control for automatic weighing and bagging; bulk loading arrangements on opposite side. A separate loading hopper is provided for breeze.

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and what results were obtained with the loudspeakers? What treatment was applied to the pipes before sheathing?

Mr. Scott replied that Bryan Donkin C.L. valves were used throughout the work. The sheathing was not an insulator to prevent condensate. The loudspeakers were very successful and had approximately 350 yards to hail. The pipes were stress relieved and scale reduced at makers' works before sheathing.

Mr. Dyer, Newport, commented that the compressing plant for the removal of condensate was not yet complete.

Mr. W. T. Hird, Wales Gas Board, pointed out that three major river crossings had been carried out by the Wales Gas Board during the last 12 months, this project being one of them. The other two were carried out in North Wales using normal practice. The protection of the pipeline was of paramount importance, and no effort must be spared in this direction. As Mr. Scott had described, the Gunite coating was used solely to give negative buoyancy and physical protection while handling—in other words purely for weight and mechanical strength. Testing of mains was the subject of a great deal of research of the Board, and experiments had been conducted utilizing radio-active gases in the mains and using a Geiger counter to record leakages. Unfortunately the gases were dangerous, and the handling time was only 1½ minutes.

Three Scottish Junior Papers

At a recent meeting of the Scottish Juniors three short papers were presented.

Three 'Variations in Horizontal Retort Practice' were described by R. A. Benson, of the South East Division. Mr. Benson deplores an 'unfortunate attitude of stagnation' in the discussion of horizontal retorts since, 'whatever the future of the horizontal, the hard fact remains that a great many districts in Scotland are served by this type of plant and are likely to continue using it for a considerable period to come.'

The first of the 'variations' is what he calls '*in situ* steaming.' At Armadale the steam is admitted continuously, though 'to obtain optimum results it should, of course, be admitted during the latter stage (only) of the carbonizing period of each retort', a practice which was deemed to entail too great a complication of controls. During a test period in the summer of 1952 steam was admitted at the rate of 8 lb. per hour to each retort, at 33 lb. per sq. in. through a 5/64 in. orifice. This quantity is equivalent to about 6% by weight of the coal carbonized. Mr. Benson claims that 'an increase of 6.7 therms per ton was recorded when steaming was practised' but he does not give the relative calorific values by which the efficiency of the process might be evaluated. As 'there was a drop in coke for sale of 1.4 cwt. per ton' it cannot have been very high, which he himself recognizes since he admits 'that the process so far developed does not make efficient use of the steam', but he claims that 'under the existing price ratio between gas and coke at Armadale' it is 'a favourable financial proposition.'

For his second 'variation' Mr. Benson describes a simple form of step grate producer using 2 tons of coke per week to generate producer gas to dilute the coal gas of his horizontal retorts. 'The object . . . is to balance the cost of coke consumed by the increase in thermal yield.' His third 'variation' is a description of modified bar grate for producers originally built by Mr. D. N. Garrie at Tayport—'a poor man's mechanical producer' in which the tilting of specially-shaped bars with a flat top is sufficient to discharge the ash. The bars are 'T-shaped but are of hollow section built up from a 2 in. x 1¾ in. channel with a 4 in. wide by ⅛ in. thick mild steel plate welded on top. Cooling water flows into each of the bars from a pet-cock connection at the front end and passes out of vents at the rear of the bars in the form of hot water or steam'. The patents are in the hands of Bates & Cook, of Leeds. Graphs show that a practically constant composition of producer gas is maintained. Clinker formation does take place but it is hoped to overcome this and to try the design in a C.V.R. installation.

The paper was illustrated by a number of remarkably well-executed drawings and graphs.

Calorific Value Testing

Mr. James L. Yule (Galashiels) gave a brief summary of the history of the movement towards the calorific standard in gas supply from 1818 to the final regulations in and under the Gas Act of 1948. He then proceeded to give a description of the testing room at Galashiels. One of the prescriptions of the Controller of Gas Standards reads: 'Some means of providing a uniform temperature in the room is required'. It is therefore a little surprising to note that at Galashiels the means of heating the room is described as 'hot water radiators without thermostatic control'. The paper carries an annotated sketch of the Lupton preheater for water supply to the calorimeter. Costs of conversion of testing rooms for this purpose at this and three other stations are given.

The paper concludes with some useful-looking notes on the actual manipulation of the non-recording calorimeter.

Oxide Purification

Mr. John M. Brown also disclaims originality in a short account of the requirements of oxide purification plant and the points to be watched in its operation and control. Mr. Brown emphasizes the necessity of keeping accurate records of the analyses of oxides fed to boxes and the timing of their feed to the boxes. Inaccurate records can lead to difficulties which may arise 'at the only time when one can't afford to let them occur, and the lesson is learnt from bitter experience.'

With regard to the preparation of semi-spent oxide: 'My own personal opinion is that all semi-spent oxide should be mixed with peat before being charged again to the boxes in the proportion of up to 10% in weight depending on the condition of the semi-spent oxide.' In the case of smaller works he suggests that a prepared mixture might be sent from a neighbouring large works.

With regard to testing: 'The test paper should be held in the gas stream for 3 minutes or until a definite discoloration occurs'. Where this takes place before the 3-minute period is up, the time taken for discoloration to appear should be noted in seconds. Quantitative tests of oxgyen and NH_3 should be carried out at least once a fortnight and oxide samples sent to larger neighbouring works for analysis. He confesses to mixed feelings with regard to ammonia slip which in normal practice is 5 grains per 100 cu.ft. 'The main point is that excess NH_3 should not be permitted.' Oxygen admission should be controlled to 'an inlet concentration of 0.6%-0.1% for every 100 grains of H_2S per 100 cu.ft.—normally giving an outlet concentration of 0.5%-0.6%'.

Mr. Benson suggests 'a simple apparatus giving a continuous check on H_2S content of make gas'. And finally, 'Regardless of our feeling on the severity of the law regarding H_2S compared with the laxity of the control on organic sulphur, the fact remains that the present regulations are being enforced and we must ensure that the gas distributed complies with them. May all your paper tests be white!'

MEASURING INSTRUMENT PERFORMANCE

The British Standards Institution has recently issued a glossary of terms relating to the performance of measuring instruments (B.S. 2643:1955). The definitions in this glossary have been designed, as far as possible, to cover general application to instruments of a wide variety and no attempt has been made to define particular types of instruments, or terms associated with particular types of accuracy. B.S. 2643 relates to instruments designed to measure a range of values of some variable quantity, of both the indicating and recording types; and it contains definitions of the fundamental terms which have a bearing on performance.

Steam and Power Reorganization at Stratford

by

E. J. SANDERSON,

ASSOC.M.INST.GAS E., M.INST.F.,

Assistant Engineer, Stratford Works.

STRATFORD works is one of the oldest established gasworks in London. It has a claim to a place of honour in the steam and power history of the gas industry, for it was here that much of the pioneer work on waste-heat boilers was carried out. It may therefore prove interesting to record the steam and power developments at Stratford during the last 10 to 12 years. At the end of war the Stratford works was a battered but lively entity.

In 1946 the plant at Stratford consisted of a Glover-West continuous vertical installation with a total gasmaking capacity of 3.3 mill. cu.ft. per day, a horizontal house with a total capacity of 12 mill. cu.ft. per day, two Humphreys & Glasgow automatic back-run carburetted water gas plants complete with generator boilers and waste heat boilers, each designed to produce 2.5 mill. cu.ft. per day, and one Humphrey & Glasgow hand-operated down-run plant complete with waste heat boiler having an output of 1 mill. cu.ft. per day.

Electrical power generation was at that time by two d.c. generators of 300 kW and 200 kW capacity, driven by a Browett-Lindley compound steam engine, and one gas-driven unit producing 70 kW. These were installed in 1924, and in 1946 it was the accepted practice to run the 300 kW set during the winter months and the 200 kW set during the summer months, the gas-engine driven unit being operated only for emergency purposes.

Steam Production in 1946

In 1946 the steam production plant was as follows:

C.W.G. Plant Section	Max. Steam Pressure, lb./sq. in.	Steam lb./hr.
No. 1 Plant waste heat boiler	130	2000
No. 1 Plant generator annular boiler	50	2000
No. 2 Plant waste heat boiler	130	2000
No. 2 Plant generator annular boiler	50	2000
No. 1 Lancashire boiler, coke hand-fired	105	3000
No. 2 Lancashire boiler, coke hand-fired	100	3000
Coal Gas Section		
No. 1 Retort House No. 1 waste heat boiler ..	130	5000
No. 1 Retort House No. 2 waste heat boiler ..	130	5000
No. 2 Retort House No. 3 waste heat boiler ..	130	5000
No. 2 Retort House No. 4 waste heat boiler ..	130	5000
Lancashire hand-fired boiler No. 5	150	3000
Lancashire heand-fired boiler No. 6	150	3000
Lancashire hand-fired boiler No. 7	110	3000
Lancashire hand-fired boiler No. 8	110	3000

The two sections are listed separately, and it will be noted that there is considerable variation in the maximum steam pressures of the various units. A steam service joined the two sections but it was difficult to maintain balanced conditions, and in practice it was the accepted policy to work the systems separately; this practice, however, was costly in labour and involved high fuel and maintenance costs.

For a total daily maximum make of just over 11 mill. cu.ft. the works covers 18 acres.

Following War II the horizontal retort house (No. 2) was closed down and was demolished. The loss of this plant's waste heat boilers created a problem in steam production and distribution and emphasized the uneconomical layout of the remaining steam-raising plant in relation to the various points of steam usage. The generation of electricity on the works came under scrutiny, and calculations showed that with the high cost of steam generation works production was uneconomic, and arrangements were made with the London Electricity Board for the provision of a supply of 415 d.c. current sufficient to meet any anticipated demand.

Thoughts were now directed to the modernization of the existing steam system with a view to obtaining greater efficiency and economy.

Carburetted Water Gas Section

In this section of the works there was much room for improvement. Exhaust steam from the gas exhausters and turbine blowers was being wasted. It was vented to atmosphere, and only a small portion was used for room heating and preheating boiler feed water.

The two waste heat boilers, each capable of working to 130 lb. per sq. in., could work to a maximum of only 100 lb. per sq. in., as they were coupled to two low-pressure Lancashire boilers and at these pressures it was possible to work the steam turbine driven air blowers and gas exhausters only at a reduced pressure of approximately 80 lb. per sq. in.

Steam for the gas-making process was supplied mainly from the annular boilers generating at 50 lb. per sq. in. with make-up steam supplied as required through reducing valves from the high pressure system.

It was considered that economics could be effected by:—

(1) Making full use of the waste heat boilers by generating steam at 130 lb. per sq. in.

(2) Modifying the air blower turbines to work at higher steam pressures and exhausting at 20-25 lb. per sq. in. pass-out pressure, working the gas exhauster engines also at the higher pressure and exhausting the steam at 20-25 lb. per sq. in.

(3) Storing and making use of the exhaust steam from these machines for the gas-making process.

(4) Making use of the steam generated in the annular boilers, for make-up requirements for the gas-making process and using the excess at the vertical retort house for retort steaming and for other works requirements where low pressure steam could be employed with advantage.

It was estimated that the savings resulting from these steps would allow the shutting-down of two hand-fired Lancashire boilers.

In the coal gas section of the works little had been done to improve steam raising and distribution. Production was uneconomical and costs were high. Sufficient steam could be generated to meet average daily requirements but resources were strained when anti-freeze precautions were necessary.

From a paper presented to the London and Southern District Junior Gas Association on April 6, 1956

The main boiler house installation consisted of four coke-fired Lancashire boilers. Two were maintained for normal working, the other two acting as standby units for winter working and anti-freeze purposes. This method of operation was obviously wasteful. On the occasions when it was necessary to bring into operation the standby boilers, additional labour was required, this invariably coinciding with peak gas production when labour was at a premium. Because of this working pressures were reduced to those of the lower pressure standby boilers and the system provided little reserve in the event of sudden high demand.

To overcome these difficulties and to reduce production costs it was considered that the conversion of one boiler to mechanical firing would give greater steaming capacity, a more even flow of steam and, by substituting breeze in place of coke, considerably greater economy. For standby purposes

the second high pressure boiler should, it was thought, be converted to tar firing.

The two Spencer-Bonecourt induced draught waste heat boilers installed in 1923 were provided with waste gas exhausting fans driven by 22 h.p. D.C. electric motors. These operated satisfactorily but, in view of power failure immobilizing the boilers, it was decided to convert the drive to steam turbine and to use the pass-out steam for low pressure vertical retort base steaming.

Steam Services

The interconnecting steam mains in the section between the boilers and the principal steam users were in some cases under capacity, in poor condition, and badly routed. It was therefore necessary to incorporate in the proposed project renewal of many sections of the steam main and its supporting structure. The following items exemplify the type of plan adopted.

(1) *Conversion of an existing C.W.G. section Lancashire boiler to steam accumulator:* This work, carried out in co-operation with a contractor, provided a steam storage vessel with a total capacity of 1,500 lb. at 24 lb. per sq. in. pressure. The outlet main was designed to give high rates of discharge for short periods of up to 10,000 lb. per hour. Provision was made for the exhaust steam from the air blower turbines and exhauster engines to pass to the accumulator, and this provided most or all of the steam requirements for the gas-making process. Any variation in requirements was catered for by the inclusion of a hand controlled stop valve, 'A' (Fig. 1), passing steam from the annular boiler system. The completed vessel was raised on a suitable concrete foundation insulated with wool fibre mattress lagging, wired and banded to the shell. The completed arrangement of mains, storage vessel and gas production plant is shown diagrammatically in Fig. 1.

(2) *Conversion of Lancashire boiler to boiler feed water storage vessel:* This work, yet to be completed, will consist of stripping down to the bare shell, which will be raised on a concrete foundation and lagged with fibre glass mattresses. Preheating of boiler feed water will be by some of the surplus low pressure steam.

(3) *Conversion of air blower turbines and exhausters engines to back-pressure exhaust conditions:* The conversion work on the turbines was carried out by the manufacturers and consisted of fitting new nozzle rings and glands for working at the higher steam pressures and back-pressure conditions. The reciprocating steam engines driving the gas exhausters were capable of working under higher exhaust conditons but provided a problem in discharging oil-contaminatd exhaust steam. This difficulty was overcome successfully by adopting the colloidal graphite system of cylinder lubrication. No additional work was found necessary on the engines, but it was considered advisable, in view of the worn condition of the cylinder bores, to fit special expanding rings to the engine pistons.

(4) *Provision of a 4-in. low pressure steam main from the C.W.G. plant to the vertical retort house:* This main was an entirely new service installed chiefly for the purpose of conveying surplus low pressure steam from the C.W.G. plants to the retort house for low pressure retort steaming.

(5) *Installation of chain grate stoker units to No. 5 Lancashire boiler:* The conversion work consisted of installing two Oldbury mechanically-operated chain grate stokers designed for breeze burning. Ancillary equipment included forced draught electrically driven blowers and breeze storage hoppers. As the requirements from this boiler are low it was decided to feed the fuel by hand.

(6) *Installation of equipment for tar burning in fire tubes of adjacent boiler:* For standby duties and peak load periods it was considered desirable to have equipment that could be brought into operation quickly without calling on additional labour. Oil tar burning equipment had these advantages, the fuel being freely available and easily stored. The Clyde system adopted consists of suitable low pressure air and tar burner equipment with natural draught secondary air admitted through adjustable adjacent vanes to ensure sufficient com-

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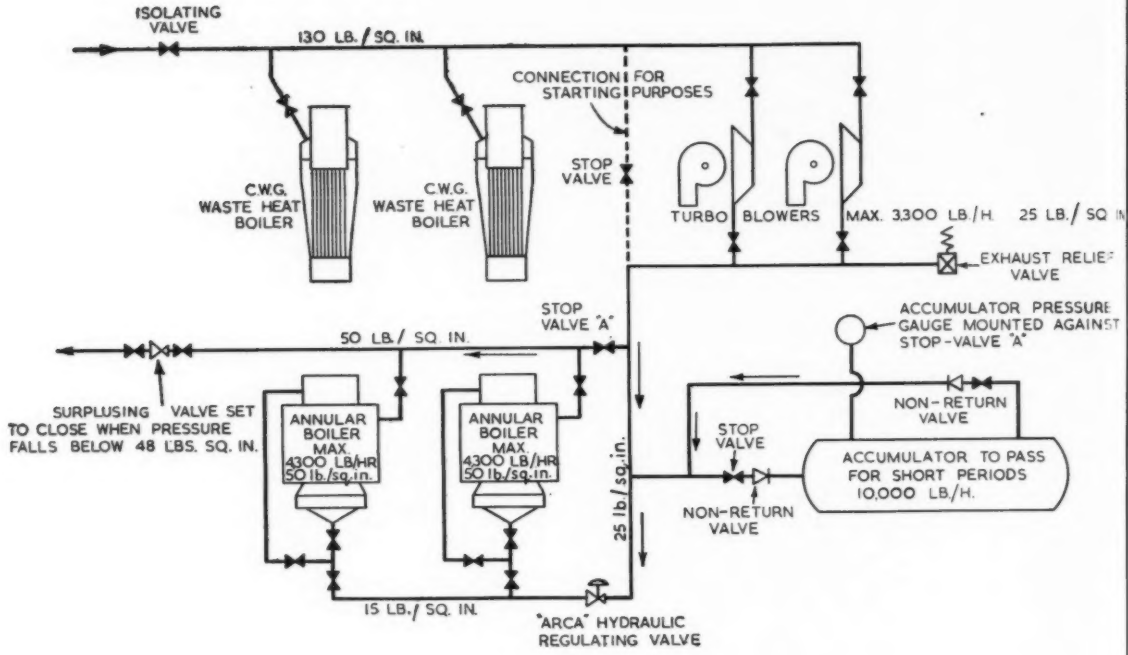
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ANNULAR BOILER MAX. 4300 LB/HR 50 lb./sq.in.
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STOP VALVE
ACCUMULATOR TO PASS FOR SHORT PERIODS 10,000 LB./H.
25 lb./sq.in.
NON-RETURN VALVE
15 LB./SQ. IN.
"ARCA" HYDRAULIC REGULATING VALVE

Fig. 1

bustion of tar mist and air, and fine gauge strainers to prevent burner blockage.

A difficulty was associated with the pressure feeding of the oil tar to the burner heads. The original method was by a small gear pump working to provide a pressure of 10- lb. per sq. in. After a few days' operations excessive we on the pump became evident, the outlet pressure dropping 5 lb. per sq. in. Other makes of pumps were tried w

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similar results, the high rate of wear being caused by the fine abrasive particles present in the tar. The use of finer gauze filters produced no improvement. The difficulty was finally overcome by the installation of a 1,000-gal. tank elevated to height to provide 10 lb. per sq. in. pressure at the burner heads, the tank being re-charged as required by an electrically driven single-action piston-type pump.

It was realized that with the now complete reliance on power from an external source there was the possibility of a power failure immobilizing the grate and fan-motors. To guard against this a small standby 8 kVA self-contained diesel-driven generator with change-over switches, directly connected to the boiler equipment was installed.

(7) *Replacement of steam prime movers to electric drive:* High on the list for both isolated position and poor operation came an old steam engine which was brought into operation for a few hours monthly for driving a conveyor on an overhead set of purifiers. Conversion to electric drive has improved the conveyor's operation, substantially reduced maintenance costs and permitted the removal of a particularly long section of steam main. Several small steam-operated pumps for gas main syphon clearing and two small steam-driven converted exhausters for supplying air to purifiers were also replaced by small electric units, and again it was possible to cut out wasteful sections of steam service. All works river and clean water pumping, apart from emergency standby plant, was converted to electrically-powered units. Further work contemplated in the near future will include conversions on the naphthalene and ammonia rotary washers and gas main syphon pumps.

The greater part of the steam main installation work has been carried out using pre-formed glass fibre sections.

Although steam condensation had been very much reduced, due to the complete overhaul of all insulation on the various services and the removal of uneconomical lengths of main, recent tests have established that wastage is still present. It is, for example, necessary to maintain under pressure, purely for emergency purposes, a 230-ft. length of 3-in. main to the works standby generating plant. Tests taken of the discharge from the two traps in the line average a total condensate of 1,500 lb. in 24 hours, which represents a loss of £200 annually.

As a result of the work several advantages have accrued, among them:

(1) Higher steam pressures and modified low pressure conditions have enhanced plant operation and improved gas-making in both carburetted water gas and coal carbonizing plants.

(2) Reduction in the number of boiler ranges at work has eased the labour position.

(3) Working conditions in the boiler house have been improved.

(4) The dust nuisance to surrounding property has been reduced.

Power Requirements

Mention has already been made of the introduction of electrical power from the London Electricity Authority grid and the closing down of the works generating plant. The two main feeder cables into the works, each 300 A, are capable of carrying the works present maximum load requirements. Up to the introduction of outside power, all works requirements were for D.C. current at 225 V; it was therefore necessary to transform and convert part of the incoming supply by mercury arc rectifiers.

With the trend towards further electrification all future equipment will be supplied for 415 volts A.C. current and existing D.C. motors, as their renewal becomes necessary, will be replaced by A.C. motors.

Costs

The cost of the scheme based on estimates at the time of supply of the necessary equipment amounted to £24,100.

COSTS AND DATA PRIOR TO SCHEME BEING PUT INTO OPERATION

YEAR ENDED MARCH, 1951

Steam used for all works purposes (excluding electrical generation)	83,320,000 lb.
Steam used for all works purposes electrical generation	13,120,000 lb.
Total steam generated (fuel-fired boilers)	96,440,000 lb.
Coke fuel consumed	4,410 tons
Breeze fuel consumed	1,890 tons
	6,300 tons
Coke at 80s. 10d. per ton	£17,824
Breeze at 40s. 5d. per ton	3,819
	£21,643
Labour costs per annum	£3,658

NEW SCHEME (BASED ON PRICES AND RATES RULING IN 1951)

Average maximum demand (fuel-fired boilers)	56,560,000 lb.
Fuel consumed (at 4½ lb. steam per lb.)	5,220 tons
Breeze fuel at 40s. 5d. per ton	£10,549
Saving in fuel costs per annum	£11,094
Labour costs per annum	£1,829
Saving in labour per annum	£1,829
Cost of running 10 h.p. stoker unit fan at 1¼d. per unit	£365
Cost of running river water, hydraulic and oil pumps at 1¼d. per unit	£657
Depreciation and other charges on capital expenditure	£1,520
	£2,542

Saving per annum .. £10,380.

Note: Related to current costs of coke and labour the saving shown would be greater than £12,000 per annum.

'Focus' on the Herbert Report

WITH the end of the printing dispute and the resumption of publication recently, we picked up the threads dropped nearly two months previously and continued our comments on the Herbert Report. This week we recount briefly some of the remarks regarding the Report which Sir Oscar Hobson makes in the March issue of *Focus*, published by the North Western Gas Board.

Agreeing with the Committee's criticisms of the pricing and depreciation policies of the state-owned boards, Sir Oscar says that the tendency of nationalised industry has been to sell its services at unduly low prices as a matter of 'public service' in the 'national interest.' This laxity, he points out, is condemned by the Committee in its report.

He describes as incontrovertible the Committee's view that in calculating net earnings and in framing selling price policy it is essential to make allowance for the cost of replacing plant and other productive assets with limited useful lives on the basis not of what the machine or other asset originally cost but on the basis of what it would cost to buy now.

Of importance to the gas industry, he says, is the whole approach of the Herbert Committee to the principle of running a state-owned business. The Committee insists that nationalised industry should concentrate on following the best commercial practices, and that a clear line should be drawn between its own commercial policy and Government policy.

'In our present national difficulties,' Sir Oscar comments, 'it is of particular importance that consumers of goods or services provided by nationalised industries should be charged the real value of the resources used up in serving them since if the price they pay is less than this the effect must be to add to the inflation from which we are suffering.' He adds: 'If the measures recently announced for dealing with inflation succeed in their object, then in the fulness of time, though it will not be soon, the burning question of the depreciation basis will finally sink back into the oblivion from which it emerged ten years ago.'

Sir Oscar questions the practicability of the Committee' suggestion that nationalised boards should be enabled to raise their own capital without invoking Treasury guarantee. Though this might be feasible for particularly well managed boards whose business was following a strongly expansionary trend, he doubts on the whole whether the market would be eager to subscribe for loans sponsored by the boards themselves without Government guarantee.

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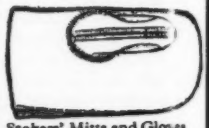

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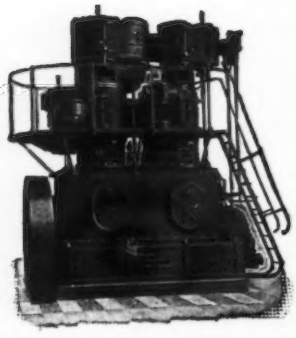

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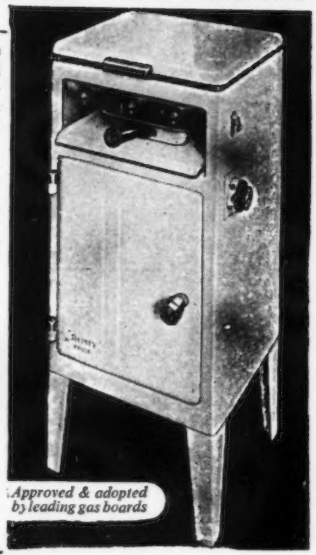

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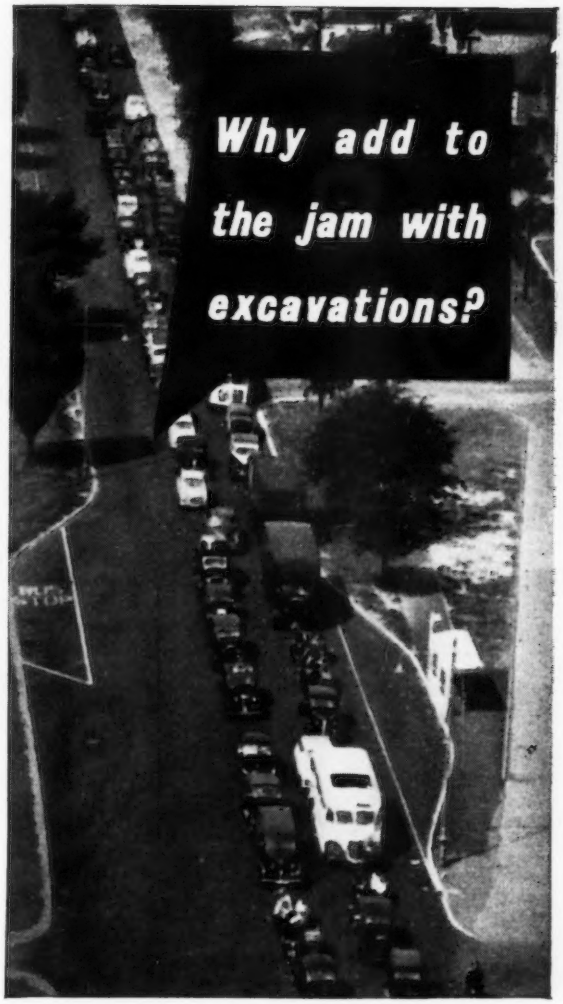

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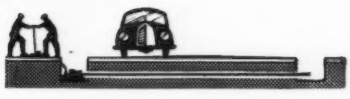

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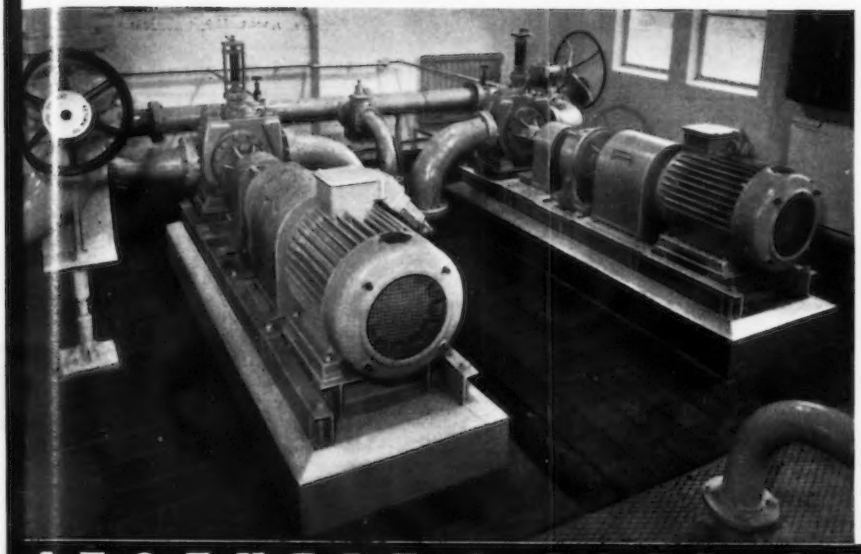

Part of our pumping installation at the South Western Gas Board's modern works at Stapleton Road, Bristol.

These steam-jacketted rotary displacement pumps are lifting viscous tar from deep tanks. Each has a capacity of 10,000 gallons per hour, running at a speed of 360 r.p.m., against a discharge pressure of 50 lbs. per sq. inch.

The photograph is reproduced by kind permission of the South Western Gas Board.

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The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

DRAUGHTSMAN required for Coke Department of the Gas Council. Candidates must be capable of making general arrangements and detailed drawings of central heating plant and industrial equipment designed to be fired by solid fuel. At least two years' drawing office experience essential. Commencing salary in grade A.P.T. 6 (£640 to £720). Post is pensionable and the successful candidate will be required to pass a medical examination. Applications to The Secretary, The Gas Council, 1, Grosvenor Place, London, S.W.1.

ASSISTANT INDUSTRIAL RELATIONS OFFICER.—The Gas Council invite applications for the appointment of ASSISTANT INDUSTRIAL RELATIONS OFFICER which will shortly become vacant on account of the appointment of the present holder to a post with an Area Gas Board.

Candidates should preferably be University Graduates and should have experience of secretarial and committee work and a knowledge of Wages Structures and Conditions of Service in Industry and of Wage Negotiating Machinery in general. The post is pensionable and the successful candidate will be required to pass a medical examination. The commencing salary will be in accordance with qualifications, but will be not less than £1,500 a year.

Applications, giving full particulars of qualifications and experience and the date on which the candidate could take up the appointment, should be sent not later than April 30, 1956, to The Secretary, The Gas Council, 1, Grosvenor Place, London, S.W.1.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION
DRAUGHTSMAN

APPLICATIONS are invited for the above appointment at Foundry Lane, Smethwick.

Applicants should possess the Higher National Certificate in Mechanical Engineering (or equivalent) and have had a sound engineering training and be competent to prepare drawings, specifications and estimates for the installation of Plant.

The salary for the post will be within the range of A.P.T. Grade 9 (£755-£855 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than April 30, 1956.

J. C. INGRAM,
Secretary to the Board.

R. & A. MAIN LIMITED have a number of vacancies both Junior and Senior in their research and development department. The posts offered are permanent and progressive, and carry salaries within the range £280-£1,375 per annum according to age, qualifications and experience.

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Write, with full particulars of age, education, qualifications and experience to National Coal Board, Staff Dept., Hobart House, London, S.W.1, marking envelope SS/253, before May 22, 1956.

WALES GAS BOARD

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Applications for the above appointment, stating age, qualifications, present position and experience, together with the names of two referees, should reach the undersigned not later than May 4, 1956.

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2535 Installations

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Our illustration shows the first B.M. Meter put to work in this country, which was supplied to the Workington Corporation Gas Department in 1931. This authority was providing a bulk supply of gas to the Harrington U.D.C. Gas Works, which was thereafter closed down for manufacture.

The system represents an early development of gasholder supply control from a high pressure line. The incoming gas passes through a 4" diameter Bryan Donkin Reynolds District Governor followed by a holder cut-off valve operated by a weight carried on a wire rope and raised or lowered by the movement of the holder.

The latter was of a spiral guided type, and the mechanical connection between the gasholder and cut-off valve was entirely designed and constructed by Mr. J. G. Pope of the Workington Corporation Gas Department. The whole system and some special precautions, are of a high degree of ingenuity, and the operation has been entirely trouble-free throughout the whole period.

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CAPACITY RANGE: 100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.

TYPE 4 COMPRESSORS (not illustrated) are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.
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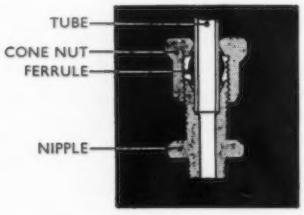

serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies.
Size Range: 1", 1¼", 1½", 2" and 2½" outlets.
Capacity Range: 45-280 cub. ft. of gas per hour.

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The Grant Lyon Railway Sidings installation for the new 60-ton Electric Melting Furnace Project at the Stocksbridge Works of Messrs. Samuel Fox & Co. Ltd. included: lifting 3½ miles of track from old sidings; filling up and making new foundations to a maximum depth of 12 ft. using 15,000 tons of slag; laying temporary track; laying approximately 5¼ miles of permanent track involving 39 leads, 5 tandems, 1 diamond, 5 single slips and 1 double slip.

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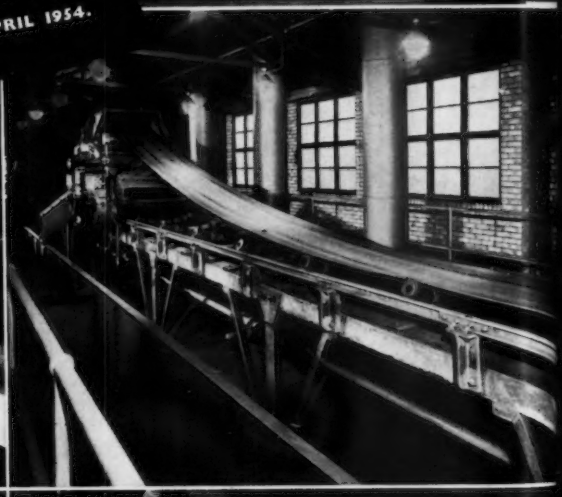

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